



1913

non loqui

1963

BOOKSHOP

at the

IN THE FIELDS OF

SCIENCE

EDUCATION

LITERATURE



Business Hours:

WEEK DAYS . . . 9 a.m. to 12.30 p.m.
1.30 p.m. to 5.20 p.m.
SATURDAY 9 a.m. to 12 noon

Phone: 86 2481

Phone: 86 2481



(To British Standard Specifications)

The Best Cement

for

INDUSTRY

The same bag of Cement enables you to
do OVERNIGHT CONCRETING REPAIRS,
make CORROSION-RESISTANT CONCRETE,
REFRACTORY CONCRETE and HEAT
INSULATING CONCRETE.



Immediate delivery from stock — send for booklet

from

George Wills & Co. Limited

136 FITZGERALD STREET, PERTH

Phone: 28 2361

contents

	Page
Editorial	4
Miss Engineering, 1963	5
President's Report	6
The Tides of Change— <i>R. H. Smith</i>	7
What Next?— <i>P.J.F.</i>	11
Hobart Symposium, 1962— <i>Michael Paul</i>	13
A Definition of Golf	14
The Wankel Engine— <i>Michael Williams</i>	15
Smoke Signals Are Now Obsolete	18
The Wind of Change in South Vietnam— <i>N. H. Sang</i>	19
Ball of the Year— <i>P. J. Farr</i>	24
Overseas Opportunities for Postgraduate Training— <i>A. C. Beck</i>	25
Automation in the University	27
An Interstate Mugga Hunt—"Brig"	29
The Death of a Greaser— <i>I.G.D.</i>	32
Year Notes, 1962—	
First Year	33
Second Year	34
Third Year	35
Fourth Year—Civil	36
Mechanical	37
Electrical	39
Fifth Year — Civil	40
Mechanical	41
Electrical	43
Staff, 1963	46
Students, 1962	47



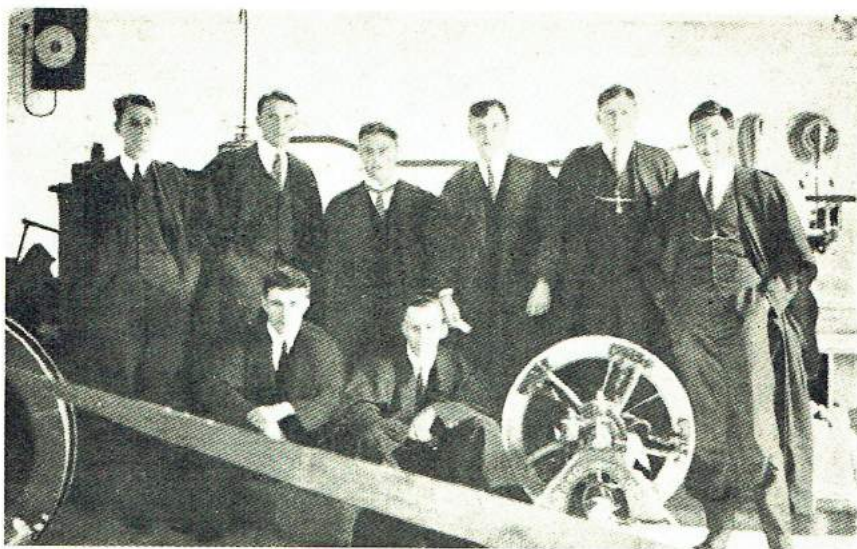
*Official Journal of the
University Engineers' Club
University of Western Australia*

Editor: I. G. Duckham

Advertising: R. Smith

*Publications Staff: A. B. Jeanes
M. Clancy
C. Waters*

1963
non loqui



FIRST ENGINEERING STUDENTS, 1913

EDITORIAL...

From the humble beginning in Shenton House fifty years ago, to the 1927 Engineering Hall, to the present day site and buildings in Fairway; the School of Engineering has changed a great deal since its inauguration in 1913. During this time the number of students in attendance has increased tenfold. Apart from changes of course for rehabilitation students after each world war, the course remained basically the same until 1960, when a radically new engineering course was embarked upon. The new course called for more units and specialisation earlier in the course, and the level of teaching became about a year ahead of that in the old course.

One is often told we do not attend university to attain a large volume of technical knowledge. What then, is meant by 'seeking wisdom'? Towards the end of this engineering course one begins to realise that more than anything we have developed an "attitude" and that this supplemented with the basic mathematical and engineering tools constitutes part of the engineering wisdom that has been sought. What determines our worth as engineers in industry or research is the ability to use this "attitude" and the basic tools to solve real life engineering problems, and also to further our knowledge in our field of specialisation without requiring formal education.

To prove our worth to society and humanity one method is to exhibit our "wares". Thus for some years now engineering students have organised and conducted their biennial Engineering Exhibitions. It is the intention of the 1963 Engineering Exhibition to inform the public, and particularly secondary school students, of the scope of engineering, to increase their awareness of the work done by the students in their preparation for an engineering degree and to indicate the professional status of the engineer in this modern society. The school student about to matriculate, having seen this Exhibition will, it is hoped, feel more inclined towards taking an engineering course at the University if he has not already made a decision

in this direction. Although this is a long, difficult course with no great financial reward in sight upon graduation, engineering can make a very satisfying and interesting career.

The provocation of the interest and curiosity of those attending the Exhibition should be urged, not necessarily by highly technical and academic exhibits explicable only by research workers, but with technical exhibits that have obvious practical possibilities coupled with lucid explanations at layman level. If this can be attained we shall have achieved something worthwhile with the Exhibition.



MISS ENGINEERING, 1963
JANET GRIEG

PRESIDENT'S REPORT...

We have, without a doubt, the strongest Faculty Club in Australia! Throughout the various States, Engineers' Clubs are the most active and powerful. When Engineers' Clubs meet at Symposiums, or organise, then we find our own club always predominant. This is something of which we can be well proud.

Nineteen Sixty-Two was another good year—not necessarily for events but for the Engineers' Club. Certainly the club began to change, and, I think, for the better. Let us look at our activities briefly and at our successes in the various fields.

The First Term Buck Show was as rowdy as ever—a good turnout and excellent feeling being expressed as a local noise. The Engineers' Ball was of a different nature—certainly everyone enjoyed the new angle—new surroundings and a large number of “old boys” present. We managed to maintain a high standard of decorations while we gained more of a feeling of togetherness.

The end of the second term brought another victory when we held a Cabaret at the Subiaco City Hall, and the production of “The Big Strong Silent Men” and its premiere showing. This film will certainly travel and should be a reliable source of income to the club for years to come. It may even appear on T.V. in about 15 years' time.

The 1962 Engineers' Dinner should be recorded in Western Australia, even Australian history books, as the most enjoyable and entertaining dinner ever held in the Commonwealth. Just imagine—our kids will probably be learning about that event in the 3rd standard. Speeches as heard on that night will never be equalled, the humour was really top class and a credit to the community.

We will have to brush over a few points like the Goyder Cup results and hope that in 1963 we will show true form. Despite our incentive scheme—I beer per man per Goyder Cup point, we managed to gain only 2nd place in the sports field. The Inter-Faculty Bath Tub Race—run by the Engineers, was won by them also—which goes to show the efficiency of our organisation.

Works visits were established as a club custom and should flourish in the future. Arrangements like this between the club and firms should provide a link between us and the community, and a means of gaining engineering information for club members.

Whilst missing several points on club activity I would like to thank members and committee members for their co-operation last year and wish the incoming committee the very best with club affairs.

A. B. JEANES,
President, 1962.

U.E.C. COMMITTEE, 1962

President: BRUCE JEANES
Vice-President: ROY PENBERTHY
Treasurer: BOB STYLE
Secretary: IAN DUCKHAM
Third Year Representative: HARRY BURDEN
Second Year Representative: PETER WALKER
First Year Representative: COLIN TEMBY
Committeemen: GEOFF ADAM, ROY SKINNER

“The Tides of Change”

by R. H. Smith

With the pink cloud of Indonesia looming, it appears, ever closer on our Nor-West Coast, more and more Australians are looking in this direction. Even in the south-east corner of the continent, Victoria and New South Wales, there is a growing awareness that the Nor-West and North exist. It is at this juncture that two schools of thought emerge.

The first school claims that this section, as it is, is worthless and that no Asian power in its right mind would want it. So leave it alone. Unfortunately these people are the ostriches of our society hiding their heads in the sand. What they overlook is that certain people wanting propaganda will not mention that the area is mostly arid unless irrigated, mountainous, etc., but only that there are very few people living there. To uneducated Asiatics ten acres of ground is a gigantic holding, that one station requires tens of thousands of acres is inconceivable.

The other school of thought, the one to which the author belongs, is to develop this area, not to become self-sufficient alone, but to make the south and south-east of the continent depend upon it. This means it must supply something which is used by everybody, and so its loss would affect everybody. There are only a few such items and we shall look at some in detail.

Food is an essential for human existence and the Kimberley region already produces considerable quantities of beef cattle. For crops irrigation appears necessary but some local inhabitants claim that due to the depth of top soil subterranean clover only is suitable and so the irrigation should be used to increase the carrying capacity of the land.

Former Commissioner for the Nor-West, Mr. Geoffrey Drake-Brockman, in 1927 suggested, in a paper read to the Institution of Engineers, Perth Division, that a survey be conducted on the five river basins in the area and conjectured that this research would show:—

Quote:

That irrigation is an essential aid to any further marked increase in population and production.

That enough water flows to waste in good seasons to make possible the conservation of sufficient supply to meet the requirements of all years.

That sites for sluch conservation are available.

That in some rivers underground water will be obtainable in sufficient quantity for irrigation.

That holdings of 50,000 acres on the better lands and 200,000 on the poorer will be about the same economic size.

That carrying capacity of sheep and cattle lands can be at least doubled.

That with smaller holdings and the use of irrigation the population and production can be so increased that the construction of railways within these main basins will be justified.

That the Kimberley rivers can be trained so as to release the rich alluvial plains for cultivation and grazing through the year.

That many of the northern cattle stations can be profitably converted into small sheep stations.

That the cattle herds can be so improved as to supply Wyndham Meatworks with first rate beasts.

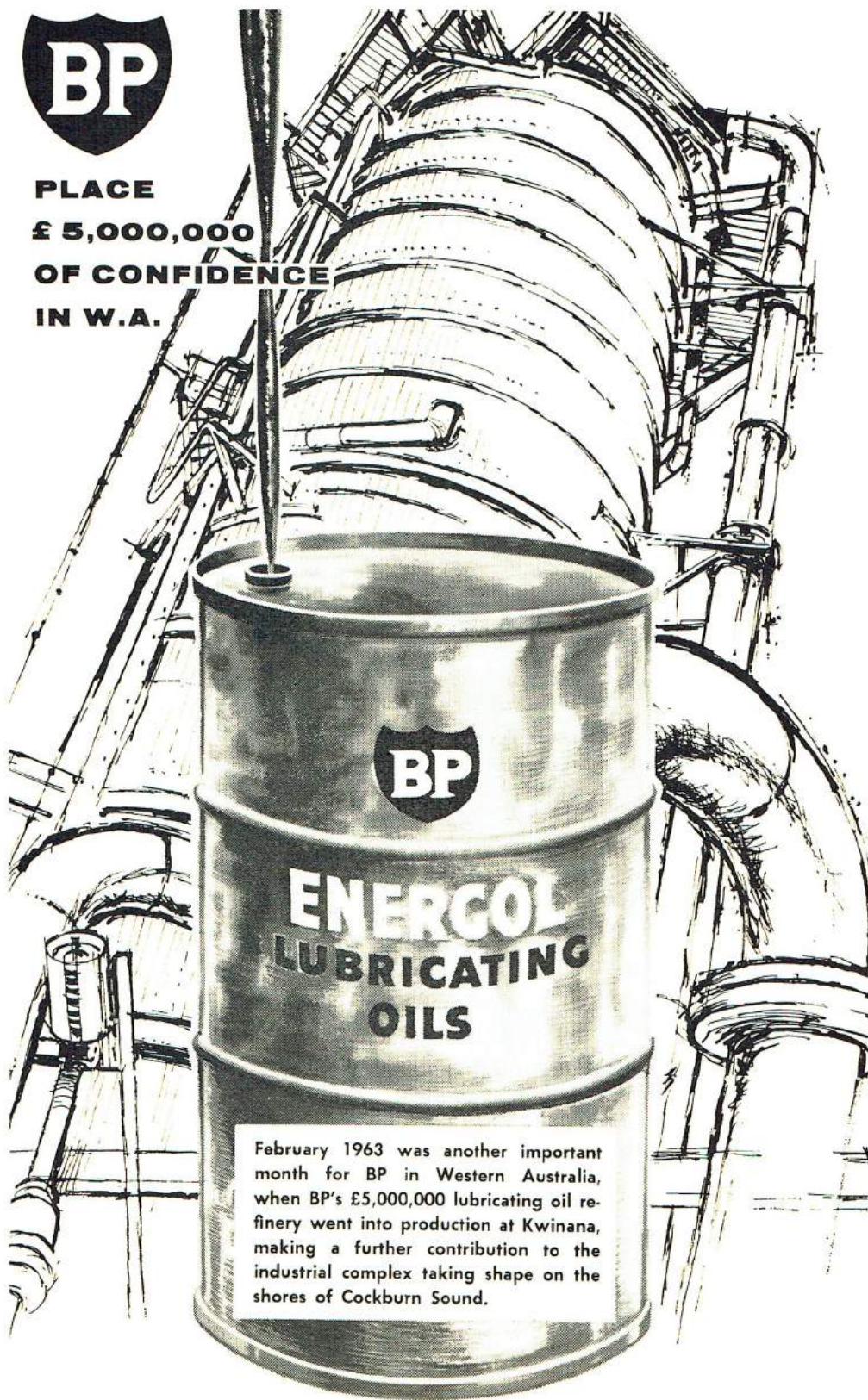
That with a suitable steamship service to Wyndham and the construction of a railway up the Ord River Valley large areas in this basin can be closely settled, pig farming and the production of tropical crops such as cotton, coffee, rice, etc., being the basis of such settlement.

That the Grey-Oakover basin is capable of supporting a large mining population.—*Unquote.*

That Mr. Drake-Brockman anticipated the Ord Scheme by some 30-odd years is a tribute to his far-sightedness or a dismal reflection on



**PLACE
£ 5,000,000
OF CONFIDENCE
IN W.A.**



February 1963 was another important month for BP in Western Australia, when BP's £5,000,000 lubricating oil refinery went into production at Kwinana, making a further contribution to the industrial complex taking shape on the shores of Cockburn Sound.

our governmental system, but he does make clear his conviction that crop growing is not only practicable but desirable.

Thus the Nor-West may be able to supply more food than at present but this would most probably be export material and so not directly affect the people in the south and south-east. One other raw material that this area has is water and it may be economic in the future to pump this water at least to Perth. As water resources all over Australia are reaching their capacity; this would be desirable and probably make the whole of Western Australia more densely populated than at present.

These things all are necessary to life but come up against transport problems. For South-East dependence upon the Nor-West it is necessary that the commodity be cheap in the South-East, this in turn means either low cost of production, and/or low 'transport' cost. One item that does have both these attractive attributes is electric power generated by tidal forces. This proposition we will examine in more detail.

Firstly, let us examine the distance involved. Suppose the tidal station to be situated in or near Broome and the load to be Sydney some 2,100 miles away as he crow flies. For 50-mile transmission on the usual type of transmission

line the wave length is $\frac{186,000}{50}$ miles, i.e., 3,720

miles or about twice the length of line. This means that interference effects on the line cannot be neglected if the line is to be tapped at any point. Modern practice, however, is not to use high voltage AC transmission over large distances. The use of AC-DC converters enable high voltage DC transmission to be employed. These converter units are extremely efficient about 99% efficiency being quoted as possible.

Thus it may be seen that the use of DC transmission is not without precedent (a word dearly beloved by politicians) having been successfully applied in Russia and in the English Channel Project. The power loss on these lines is less than for the AC transmission due to the fact that the line does not exhibit inductive and capacitive effects and so the resistance may be lower to compensate phase shifts.

The main advantage however is in capital cost. A three-phase AC line requires three conductors, suitably insulated and elaborate protection equipment to protect the plant attached to each end of the line. With DC transmission fuses are usually all the protection that is required. The DC line can of course only carry real power and cannot provide the reactive component but the use of synchronous condensers at the load end of a long line is common practice even with AC transmission and would doubtless be employed here.

The reader may be wondering at this point "What about the Snowy Scheme, surely this supplies a lot of power to the South-East of the continent?" Actually this is not so! Already the S.M.H.E.A. supply only about one-eighth the requirements of Victoria and New South Wales, and in fact takes the peak loads. Victoria has proposed that a cable similar to this English Channel cable be run from Tasmania to Victoria to utilise the available hydro-electric power in Tasmania for its peak loads and to supply Tasmania in Victoria's off peak periods which correspond to Tasmania's peak load periods. Clearly, therefore, the proposal to take power from the Nor-West to the South-East of Australia is economically justifiable if the production of the power is cheap enough.

Tidal power is, naturally, remarkably cheap. The tides are there whether we use them or not and hence the input to the system is free. Therefore the only costs that need concern us are capital cost and maintenance costs.

Capital cost may well be less than a similar size hydro station or fuel station. Being a water turbine the plant does not require the costly auxiliary plant employed in thermal stations and so the tidal station may be cheaper than the conventional fuel station. As the tides are a daily phenomenon there is no need to conserve water for long periods of time and so dam costs would be less than those of conventional dams.

What of the generating units themselves? Firstly a necessary condition is that they work regardless of the direction of the water flow. This eliminates Pelton Wheels and Francis turbines as the prime mover, but a propeller tur-

bine such as a Kaplan turbine may well serve the purpose. In fact at Rock River in Illinois, U.S.A., a Kaplan turbine works under a seven foot head developing 800 horsepower, and so such a turbine would be quite at home under the 20 foot monkey head that could be made available by the tides.

The French, who are at present the leaders in this field, have developed the turbine-generator as a package type of unit. This means that maintenance is really quite simply done by removing the whole unit and "plugging in" another. This is a naturally convenient thing to do as all maintenance can be done in a workshop. A spare set may be kept in the workshop and exchanged for a faulty unit if at any time a fault occurs, this in turn means that it is not necessary to construct dams for standby plant.

As everyone knows engineers love to talk of efficiency, so what is the expected efficiency of these units? Firstly, let us examine the significance of the efficiency. The input, as remarked before, is free, therefore the output cost is maintenance and depreciation. In general the higher the efficiency the higher the original cost and hence the depreciation rises. Secondly, the higher the efficiency the more critical the alignment and so on, hence maintenance costs also rise. To offset this, however, the lower the efficiency the bigger the storage required and the capital cost goes up again.

The final design therefore is a form of compromise. Assuming that standard types of turbines and generators are used the Kaplan turbine should have an efficiency of between 85 and 95% and the generator 90% plus, thus the minimum efficiency we could expect to be about 76%. Compare this with 26.5% for South Fremantle. The transformer and AC-DC converter losses should also be added to this calculation but as previously stated the import is free so why worry.

Let us again look at the overall picture from sea to factory. Firstly, the dams, obviously two dams per station will be required—one to retain the water at low tide and one to remain dry at high tide, water flowing between these dams turning the turbines. The turbines then in turn will drive the generators which would be

three phase AC. The output from these generators would then be fed into transformers stepping the voltage up to, say, 300-500 K.V. from whence it goes to the DC-AC converters. From the converters the power passes to the transmission line, which may be one or two conductors. Ground return is possible and would lower the cost of transmission. At the load end of the line is another DC-AC converter which converts the DC back into AC which then goes to a step down transformer and thence into the distribution grid. Synchronous condensers being used at this stage to supply the reactive power component.

This sounds all very well but what is stopping us? The answer can be given in two words, money and politics, especially the latter. The necessary work would have to be carried out at a national level and as yet the North-East corner of the continent, which controls half the Commonwealth Parliament, is just not sufficiently interested in the Nor-West, they in fact belong to the ostrich school of thought mentioned earlier. Thus it would be political suicide for either party to suggest such a scheme unless elections were postponed indefinitely, or the other party agreed with the scheme and Australian political parties don't seem to work that way.

Suppose for the time being that political agreement can be reached that the Nor-West must be developed. The present State and Commonwealth policy seems to be to give to each section a little bit to keep them happy and as a result nothing concrete is achieved. Small pilot farms are established and the small crop, the only one for hundreds of miles, is eaten by all the kangaroos, insects and birds within a hundred mile radius and so the scheme "fails", but "we tried didn't we?"

The solution appears to be in a form of "crash" programme such as the now famous Tennessee Valley Project in America. This highly co-ordinated investment of capital and works eliminates nearly all the risks associated with haphazard spending by local authorities and something concrete is achieved.

Let us conclude therefore by suggesting that the irrigation schemes and the tidal power

schemes grow side by side to produce more food and industrial growth in one of Australia's richest but most underdeveloped centres. Naturally not all the tidal power need be sent to the East but development of aluminium refining and other processes requiring cheap electrical power may in time be established in our

north to open up this vast region. I only hope it comes before it is another province of a foreign power.

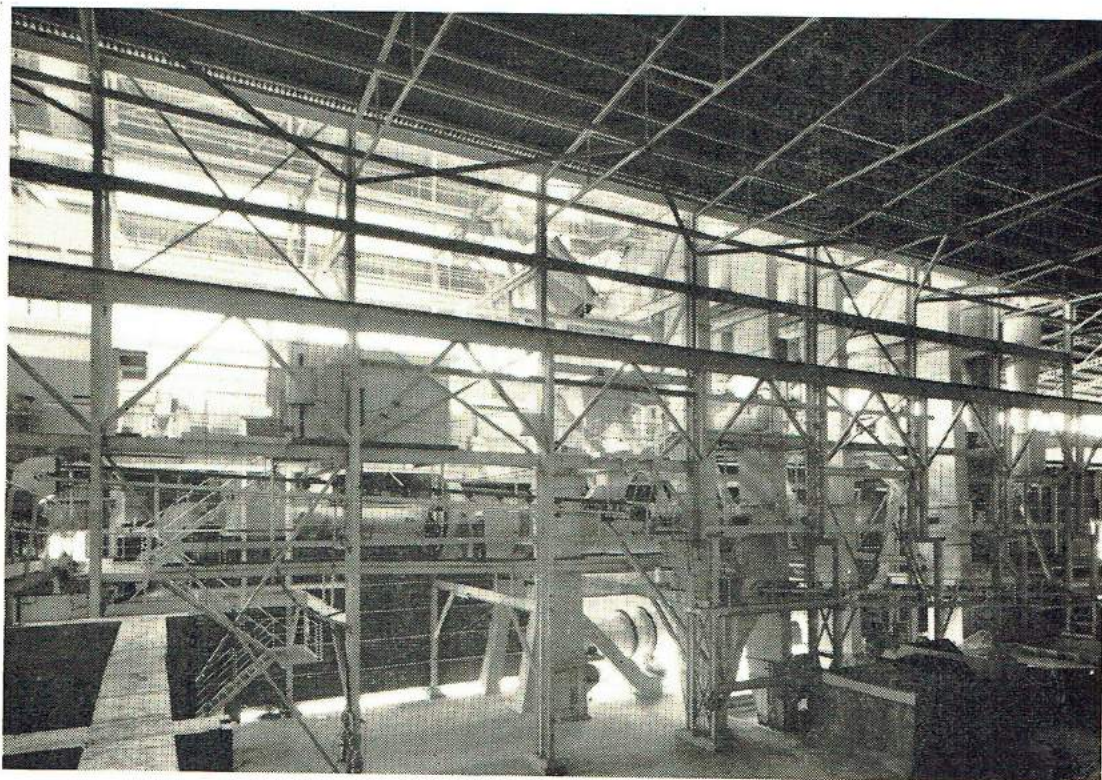
Don't despair, something IS being done, see "The West Australian" Thurs., April 4th, 1963. —Ed.



WHAT NEXT!

What with temperamental bridge engineers
And Liz not being well when they wanted to
film Cleopatra
The favourite coming in somewhere in the
middle of the field
And Khrushchev lagging in steel production
Not to mention JFK having to oil the party
machines with post offices
And the greater Zanuwauck dying out in
South Africa
Rabbits starting to think of Myxo as long service
leave
And Sir Robert not sure of bust or boom
Couples with facts like
3.7% of the national income of Chekoki Island
being spent
On imports or artificial coconut palms from
Greenland
And oil wells being put down at fantastic prices
Only to discover that they are not oil wells at
all so much as
Plain ordinary holes in the ground
It makes you wonder just what you can count
on
Other than plain simple facts of life like
Women's fashions disputing nature
Bomb scientists trying to phase nature
Weather forecasters flying in the very face of
nature
And nature
Well
Nature just seems to take it.
All of which goes to prove that an Engineer
derives great peace of mind
From a cool glass of beer.

P.J.F.



Engineers advance Fertiliser Manufacture!

Wholly designed and built in Western Australia by CUMING SMITH and MOUNT LYELL FARMERS FERTILISERS LTD. engineers, this granulated compound fertiliser plant is one of the most efficient of its kind in the world. The plant, commissioned late last year, produces high quality granulated fertilisers specially formulated for horticultural crops grown on West Australian soils.

Over thirty graduates are employed to direct the effort of more than 1,000 people who work each day to keep the farmers of Western Australia supplied with essential plant food.

Engineers have the responsibility of continually improving equipment and mechanical methods to maintain maximum efficiency in Company works throughout the State to keep ahead of the yearly increase in demand. That fertiliser production in Western Australia in 1962 reached more than 720,000 tons is a tribute to the work of these men, together with the other men and women who work with them at CUMING SMITH and MOUNT LYELL FARMERS FERTILISERS LTD.

CUMING SMITH & MOUNT LYELL

FARMERS FERTILISERS LTD.

133 ST. GEORGE'S TERRACE, PERTH

WORKS at Bassendean — North Fremantle — Geraldton — Bunbury

HOBART SYMPOSIUM, 1962

by Michael Paul

The 1962 Engineering Faculty Bureau Symposium held in Hobart was, as usual, a great success. The theme, appropriate to the climate was "Antarctica—The Problem of the Deep South".

A group of about 70 students attended, representing each State, the majority perhaps coming from Sydney University. W.A. was well represented by a small but dynamic group of six members each pledged to outdo any other in the noble arts of eating, drinking and conning. The Tasmanian students, representative of a small community rather like Perth, were the perfect hosts providing all the necessary requirements for a good time.

This was the first trip to Tasmania for any of the W.A. men. The trip across the Nullarbor had been hot and mainly uninteresting and to be transferred to a part of Australia where the temperature rarely reached the low seventies was really an experience. The Tasmanians, however, proved to be much the same as the local members, liking both cold beer and hot women. Being close to first arrivals, we were given V.I.P. treatment and shown all the sights from Government House, to the lowest dive, within hours of our arrival. The accommodation provided us was at Christ College, the Anglican University College, situated high on Mt. Nelson overlooking both the University and the River Derwent.

Hobart itself, one of the first Australian settlements, is magnificently situated on the banks of the Derwent under the towering snow-capped peak of Mt. Wellington. The city is old, but the University has only recently been re-sited and constructed using very modern trends. The buildings are pleasantly designed to fit in with the sloping ground, but to remain functional.

The Engineering School is one of the most impressive buildings on the campus and it was here that the lectures were held. Six lectures were presented in all, each being by an authority in his field who had actual experience in Antarctica. The Australian National Antarctic

Research Expedition A.N.A.R.E. provided most of the speakers and they all proved most interesting. The first lecture "An Introduction to Antarctica" was given by Mr. J. Berchervaise who has led two expeditions. He talked for well over an hour, without the aid of lecture notes and with illustrating colour slides, retaining the interest of all. Other lectures covered Aviation, Transport and Communications showing the developments which had been made for application to Antarctic conditions. The last two lectures were given by Mr. P. G. Law, Director of A.N.A.R.E. These delved into the problems of living in Antarctica and the probable future developments. These, while perhaps not directly connected with Engineering, did much to broaden the outlook of the audience and to put the whole picture of Antarctica into proper perspective.

The more serious side of proceedings was supplemented and in some cases dominated by a heavy social programme. The Smoke Social in the good tradition of all such shows was a real swinger. A mere 70 gallons was rolled in and rapidly quaffed by the members. The "Boat Races" proved the most successful event of the evening as usual. The W.A. team, although low in numbers, took on all-comers and only just failed to take the title from N.S.W., who had a group of 30 to choose from. The night was proclaimed a great success but there was many a chuckle next morning.

All spare moments were taken up with trips or excursions to places of engineering interest. The mechanicals and electricals showed great interest in visits to Cadburys, Consolidated Zinc and the Television Transmitter on Mt. Wellington, although the latter degenerated into a bit of a free for all in the snow. The civil bods were shown over the Tasman Bridge now under construction: this new structure will dominate the approaches to the city and dwarf the existing Pontoon Bridge. The navigation span is made up of pre-stressed concrete girders up to 16 feet deep and 160 ft. above the water.

Another trip of more historical interest was made 70 miles south to Port Arthur. The ruins of the old penal settlement provided good camera material and the "shutterbugs" were hard at it.

Two dances and an evening barbecue helped the fellas to try out the local talent. Most enjoyable! It was, however, the finale river cruise which will be best remembered. Taking a plentiful supply of ale, we lunched at a small resort downstream. One of the locals who had missed the boat drove down in his car, this was then manfully lifted aboard and he drove home

perched on the fo'ard hatch under the eyes of a rather disconsolate skipper.

The symposium as a whole was a great success. Not only did the lectures broaden the outlook of the participants, but the social events brought together student engineers from all parts of Australia. This enabled contacts to be made and ideas to be exchanged which can only be for the good of the profession. If the Sydney Symposium 1963 is half as good as the one in Hobart, the effort made in going East should be well worth it.



A DEFINITION OF GOLF

Golf is a form of work made expensive enough for a rich man to enjoy it. It is a physical and mental exertion made attractive by the fact that you have to dress for it in a £50,000 clubhouse.

Golf is what letter carrying, ditch digging and carpet beating would be if those three tasks had to be performed on the same hot afternoon, in short pants and coloured socks by gouty looking gentlemen who required a different implement for every mood.

Golf is the simplest looking game in the world when you decide to take it up, and the toughest looking after you have been at it ten or twelve years. It is probably the only known game a man can play as long as 25 years and then discover that it was too deep for him in the first place. The game is played on carefully selected grass with little white balls and as many clubs as the player can afford. These balls cost from 3/- to £5 and it is possible to support a family of ten people for five months on the money represented by balls lost by some players in a single afternoon.

A golf course has eighteen holes, seventeen

of which are unnecessary and put in to make the game harder. A "hole" is a tin cup in the centre of a "green". A "green" is a small parcel of grass costing about 7/11 a blade, and usually located between a creek and a couple of gum trees or a lot of unfinished excavations. The idea is to get the ball from a given point into each of the eighteen cups in the fewest strokes and the greatest number of words. The ball must not be thrown, pushed or carried. It must be propelled by about £15 worth of curious looking implements, especially designed to provoke the owner.

Each implement has a specific purpose and ultimately some golfers get to know what that purpose is. They are the exceptions. After each hole has been completed the golfer counts his strokes. Then he subtracts six and says, "Made that in five. That's one over par. Shall we play for a ball on the next hole, too, Wal?"

After the final or eighteenth hole, the golfer adds up his score and stops when he has reached eighty. He then has a shower, ten whiskies, sings "Sweet Adeline" with six or eight other liars, and calls it the end of a perfect day.

THE WANKEL ENGINE

by Michael Williams

During the last 40 years many attempts have been made to design an internal combustion engine whose mechanism involved purely rotary motion. These efforts were made in the face of the inadequacies of the reciprocating piston engine with its inherent unbalance and tremendous internal inertia forces.

The modern reciprocating internal combustion engine nevertheless, has been developed to an amazing degree making it almost a marvel of engineering that such a clumsy mechanism could become so convenient.

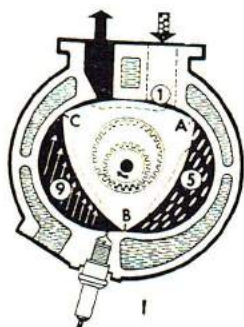
There have been only two successful rotary engine designs. The first is the gas turbine which after about 20 years of development still seems restricted to large machines. These have been made small enough for automobile use but only at the cost of extremely high fuel consumption. Recently though, firms like Chrysler and Rover have stated that they are almost ready to commence production of gas turbine powered cars.

The other successful design is Felix Wankel's engine first designed in 1954 and later kin-

matically invented by Dr. W. Froode of N.S.U. in Germany. This form, known as the K.K.M. engine, as against Wankel's original D.K.M. engine, may be considered successful as it has now gone into production to power a water-ski craft.

The K.K.M. machine consists of a triangular rotor rotating about the machine's axis. The rotor has within it an internal gear which rolls on a fixed pinion in the centre of the machine. The cycle is explained in the diagrams being basically the same as that in a four-stroke piston engine, the machine being of the positive displacement type. Each apex on the rotor sweeps the same epitrochoidal path—the slightly waisted oval "cylinder" in the diagram. This motion of the rotor is entirely constrained by the internal gear and an eccentric shaft through the machine from which the drive is taken.

Most of the problems associated with this machine were new to the practice of engineering and involved a tremendous amount of work and testing. However, after only a few years, the engine's reliability, economy, life and total



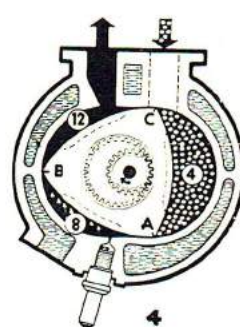
Just after firing, gas is expanding between rotor lobes B and C; this is the power stroke. The segment between C and A is on "minimum volume" and the inducted charge contained between A and B has begun compression. (Rotation is clockwise).



Exhaust port is open and gases (B-C) are part-way discharged by pressure from revolving rotor. Induction stroke (C-A) is almost completed, and compressed gases between A and B have been ignited by the spark plug. Engine is thus commencing its next power stroke.



Rotor has moved through about 15 deg. and is now about to uncover the exhaust port; with power stroke (B-C) at full expansion and gas about to be expelled, C-A is already part-way through induction; A-B is partly compressed, in readiness for its power stroke.



Power stroke between 4 and B is developing, driving rotor around to exhaust B-C's gases and (between C and A) commence compressing the following charge. Note how all four strokes in one segment have taken place in only one-third of a revolution by the rotor.

EMPLOYMENT WITH THE SHELL COMPANY OF THE FEDERATION OF MALAYA AND SINGAPORE

Career opportunities exist for men of ability, possessing Malayan or Singapore citizenship and the ambition to fill top level positions.

Initial enquiries are invited from all University students, particularly Mechanical Engineers, and in the first instance should be directed to

The Personnel Officer

The Shell Company of Australia Limited

205 St. George's Terrace, Perth

Phone 21 9531



A.P.E.A. and YOU

The Association of Professional Engineers, Australia

The Association of Professional Engineers, Australia, is a National organisation formed in 1947 to raise the status of Professional Engineers to a level which recognises their responsibilities and needs.

THE A.P.E.A. has, since its inception, progressively gained recognition as THE association representing Professional Engineers in industrial matters on a national scale.

It has achieved a national award through the Commonwealth Conciliation and Arbitration Commission, the minimum rates being as follows:

- (1) *Qualified Engineer—*
Diploma, £1,431
Degree, £1,571
- (2) *Experienced Engineer (5 years*
experience or A.M.I.E.Aust.),
£2,231

It has recently achieved substantial salary gains for senior Professional Engineers in the Commonwealth Public Service and Snowy Mountains Hydro Electric Authority and is currently pursuing their translation into State spheres.

Other services offered by the Association include appointments, information, legal advice, personal assistance and a monthly journal "The Professional Engineer".

The Association admits to membership employee Engineers who hold academic qualifications recognised by the Institution of Engineers, Australia, for admission to Graduate or Corporate Membership of that Institution.

A student section of the A.P.E.A. has been formed at the Engineering School and interested students should contact Jeff Smith (Fifth Year Civil). Enquiries as to full Membership should be made to the Secretary, Box B77, G.P.O., Perth.

outlay has become competitive with the piston engine which seems to have reached the end of its development.

Looking at the major problems associated with manufacture and design in turn we shall first consider the making of the epitrochoidal track. An epitrochoid is the curve traced by a point on a disk rolling without slip around another fixed disc. In this case the generating disc is half the diameter of the base circle and the generating point is the mid-point of a radius on the generating disc. The machining of this track, which must be very accurate, may be done in two ways. Firstly, a direct generating machine may be used where a small grinder is constrained to this geometric path by means of a linkage, or, secondly, a copying machine with a template may be used. Trials have been made using an envelope or track made of cast iron or hard plated aluminium which assists the cooling.

The rotor sealing has been by far the biggest problem. As the motion of the rotor is constrained to its envelope with no force between the rotor tips and the envelope; all that is needed is a gas tight seal in what must necessarily be a small clearance. Many ingenious sealing systems were tried before N.S.U. decided upon a comparatively simple system of radial strips in the tips of the rotor and ribs let in along the edge to seal against the side plates of the machine. All seals have light wave springs behind them to maintain an outward force. The tip seals are assisted by centrifugal force while the side seals are assisted by the gas pressure.

An important point in the tip sealing is the manner in which they rock or tilt with respect to the envelope surface. That is the bisectors of the rotor apexes do not remain normal to the surface on which they run but lean from this normal by some 20 to 30 degrees depending on the actual design. The sealing at any instant depends on line contact, so that, ideally, knife edge seals should be used. However, these are impractical and cylindrical ends are used. The envelope tolerance is made equal to the radius of this cylindrical surface on the tip seals.

Cooling is also a problem as the rotor is free of rigid mechanical connections which may

be used to drain the heat. The solution to this problem was to circulate the lubricating oil within the rotor and then pass it through a special radiator. The oil within the rotor is kept to a minimum to reduce power losses due to churning. From the diagram it can be seen that the power stroke always occurs in the same section of the envelope causing extreme heating of this one section. A plain water jacket is used around the envelope but requires careful design to prevent distortion of the casing.

Carburettion posed no problems at all as it is strictly conventional. Ignition is also conventional but plug life is short and special plugs may have to be developed to give a satisfactory period between replacements.

Up till now no mention has been made of performance which is almost amazing. On a displacement basis of comparison a 250 cc. Wankel engine readily develops 45 b.h.p. at about 9,000 r.p.m. whilst a high performance 250 cc. overhead camshaft motor cycle engine will develop about 25 b.h.p. at the same speed. This is really an unjust comparison and a more logical comparison should be made on output per unit weight or output per size of machine though the results are equally impressive when one sees that the Holden engine develops .187 b.h.p. per lb. of its weight while a 250 cc. Wankel engine delivers about .7 b.h.p./lb. The specific fuel consumption is as yet much the same as in conventional engine, varying from .45 to .55 lbs./b.h.p./hr. The output could be boosted by supercharging, the effect being very similar to that obtained with piston engines.

Endurance is something that can only be expected to improve with refinement and development. No effort was made in early prototypes to obtain longevity which was only considered after satisfactory operation was obtained. Recently Curtis-Wright, working under licence from N.S.U., ran a 1,000 hr. test at 90% speed with a BMEP of 100 psi. At the end of the test the motor and seals were still in good condition and although the spark plug was still operating the gap had eroded .015". The engine was re-assembled and a further 300 hr. test with severe cyclic fluctuations failed to cause any trouble.

The future looks good for the Wankel engine: its big advantages being lightness and compactness. In fact it is so compact that the accessories become the dominant size factor and the engine itself could easily be smaller than the clutch-gearbox unit to which it would be connected for automotive use. Its excellent power to weight ratio would make it suitable for light aircraft. Curtis Wright have built an extremely compact 4-rotor, 4-litre engine developing 450

h.p. Larger units would be competing against turbo-prop engines which may prove superior.

Technology is now advancing at such a rate that it is almost impossible to predict what compact, self-contained prime movers we will be using in 10 to 20 years' time. How much demand is there for another petrol engine? Do we really want a superior form of energy conversion?



Smoke Signals Are Now Obsolete

*Then the little Hiawatha
Took a correspondence course.
Studied often in his wigwam,
Kirchhoff's laws and lines of force.
Wouldn't stop for Minnie-Ha-Ha,
Tempting him with breathless sighs,
Had to learn to solve quadratics;
Had to learn to factorise.*

*Integrating was quite simple—
Couldn't differentiate—
See the wild electron war-dance
When you want a stable state.
Often he would tear his hair out,
Often he would rage and squawk,
Couldn't cut a crystal axis
With a broken tomahawk.*

*When at last his studies ended
Now called Big Chief Injun-Ear,
Not for him the bow and arrow,
Guided missiles, now, I fear.
So you see how electronics
Change the life of Indian Braves.
Scalping now is out of fashion—
Push a switch for closer shaves.*

—Long After Longfellow.

The Wind of Change in South Vietnam

by N. H. Sang

For many people, it is a very strange thing to have this article published in *Non Loqui* where engineering ideas and concepts are more welcome. However, for many others, this little piece of thoughts may contribute something new to the already rich mind of our engineers.

I, therefore, take the latter view as a strong motive to overcome any hesitation that could arise in me.

Now let us begin with a little description. Between the 8th and 23rd latitudes, Vietnam covers a total area of 127,000 square miles. With its 1470 miles coast line, Vietnam has a seaboard which gives it a clear vocation and justifies the oft-used phrase "the balcony of the Far East". The South is almost entirely an alluvial plain, in the centre of which the Makong flows like an open hand. In the centre, on the contrary, a thin tongue of land separates the seashore from the long mountain range of Truongson. On the north, mountain and plain achieve harmonious balance.

For a long time, the Vietnamese people had to fight simultaneously on two fronts. While its northern frontier was ceaselessly menaced by China, they had to try to extend southwards in order to increase their vital living space which had become too small for a constantly increasing population. Marching south, they came up against the Cham people, of Malayan origin, a most brilliant civilisation, as can be seen from the monuments which still exist today near Dalat and Nhatrang (South Vietnam). The struggle was hard for the Chams were fierce warriors. But a final expedition, led by King Le Thanh Ton, put an end to the kingdom of Champa, in 1471.

The Vietnamese kingdom lasted peacefully till 1883, when the Harmand Treaty established the French protectorate over Vietnam. After

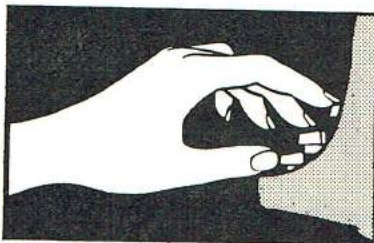
the defeat of the Japanese in 1945, the Allies organised the first partition of our national territory. A long war then began which devastated the country for ten years. The whole people rose to defend its independence. Finally in 1954, there came Dien Bien Phu, and the Geneva Agreement, which once more partitioned Vietnam. Communism, under the mask of Nationalism, turned the national aspirations to its own profit. From the 17th parallel northwards, half of the Vietnamese people are now living under a Communist regime. From the 17th parallel southwards, the South Vietnamese have their own government which possesses democratic institutions. When talking about the 14 million people now living in the south, one can not fail to include nearly one million North Vietnamese who fled to the south because they could not bear Communist rule.

Re-elected as the Head of the Republic of Vietnam, President Ngo Dinh Diem is finding himself no more lonely among his people. They soon realised that the Viet Cong guerillas were not fighting the war against South Vietnam for the benefit of its people but for the North Vietnamese Communists who caused the present situation of unrest in the south. The South Vietnamese peasants therefore, long ago taking no sides of the dispute, are now turning to the government side and are working for our national just cause: "For a better society, open to the Good as well as to the Just, and for a Vietnamese fraternity forged in struggle, spiritualised by sacrifices, and dedicated to the most brilliant victory", as the President once said.

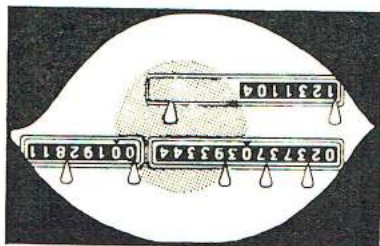
To safeguard the people against Communist terrorisms, the government introduced a new system which replaced the old system of villages: the strategic Hamlets. Inside these Strategic Hamlets, social and economical as well as

For Simply Calculating or calculating simply . . .

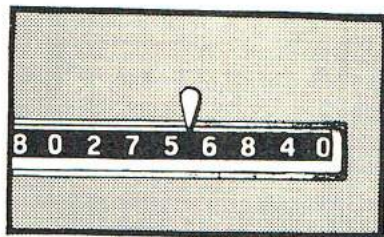
Sloping key board—your hand rests even in working position.



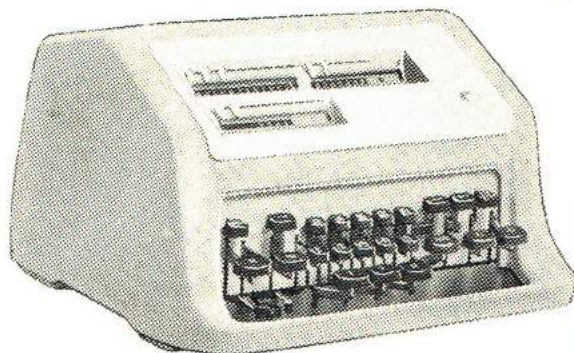
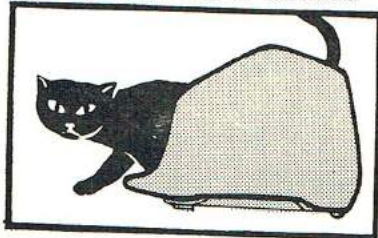
The three registers, placed in marked-off area in soft grey, are extra-easy to read.



Larger and clearer register windows and distinct figures make checking easier. Plastic decimal point indicators are easy to set.



Floating suspension on rubber cushions plus good insulation ensures quiet operation free of vibration.



FACIT

CA1-13-

automatic
calculating
machine

All electric Facit CA1-13 is the world's simplest fully automatic calculator. It has only 10 setting keys. Numbers are set up in the order they read. All keys are within reach of 5 fingers giving one hand operation which is specially suitable for left-hand touch operation.

Sole W.A. Distributors:

EDWARDS

BUSINESS MACHINES

107-109 Wellington Street, Perth - 23-2127



political reforms are taking place. And outside them, the government military clean-up operations are putting the Communists under constant retreat to certain defeat. In his message to the National Assembly on October 1st, 1962, the President said:

"It (the Movement of Strategic Hamlets) brings us, along with the certainty of victory, the pride to live as free men today and tomorrow."

Under President Diem's Government, Vietnam has been developed rapidly. Food production rose an average of 7 per cent. a year. The output textiles jumped from 68 million metres in 1958 to 83 million metres in 1960. In the year of liberation 400,000 pupils attended elementary schools, in 1960, there were 1½ million pupils in elementary schools. The land reform programme has brought 110,000 rural families, formerly proletarian, to the status of land owners of a total of 430,000 hectares of rice fields, belonging entirely to them. From 1955-1961, cultivated areas for rubber have increased by 32%, for rice by 15%. The second Five-Year Plan (now taking place) will rise the annual production of paddy to 5,500,000 tons, thus effecting an increase of 18% in five years as compared to the production of the 1960-1961 season.

The industrial sector comprises of the Nong Son coal mines, the Hatien cement factory, the Tan Mai saw mill, the Hiep Hoa sugar factory, the Sicovina textile industry, the Cogido paper factory, etc. They are all working well for our national income. Completion of the first stage of the Danhim project, in 1965, will permit an 80% increase in the production of electric power. In 1960 the food production per capita in South Vietnam was 20% higher than that in 1956; in Communist North Vietnam 10% lower. These are facts.

The Republic of Vietnam has had diplomatic relations with nearly fifty countries in the world (as on Oct. 1st, 1962), including all Western great powers and Australia. In Sweden, Norway and Denmark, countries which traditionally have not in the past engaged in any military alliance, Vietnamese Embassies have been established. Austria, which after the Second World

War(adopted a similar policy, has also decided to establish diplomatic relations with the Republic of Vietnam, thus recognising our Government as the only legal government for all Vietnam. The Republic of Vietnam has exchanged ambassadorial levels to many countries in Asia, Africa and Latin America.

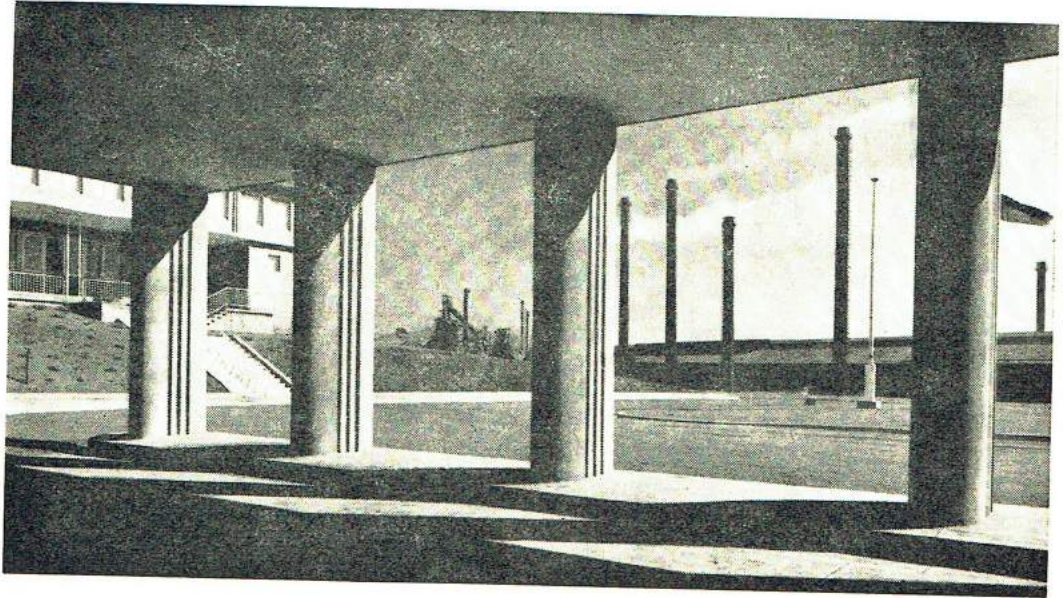
People in the Free World sometimes misunderstand our country. By looking indifferently at the Republic of Vietnam of 7 years of age, they disregard the fact that this young nation is facing a deadly vital experience; the struggle for its freedom and territorial integrity. The wind of change is blowing hard. But young men in South Vietnam, in the face of the national peril, have found their footing and stood as one man. Free men in the world must also stand behind this struggle, because it is a just cause.

The recent Chinese invasion to India was only a preliminary action of the Chinese Communists in their long plan. In his booklet, published in N.S.W., Australia, Mr. V. L. Borin wrote: "Mao is struggling for the world leadership of Communism. If he succeeds, and when he is equipped with atomic power, the Communist parties in Australia as well as in the U.S.A. and everywhere else will be under his command. Then this (Communist terrorism) may happen to you. People in Vietnam are dying, not only for their liberty, but for yours as well."

Some people outside S.E. Asia are reluctant towards that region because they usually mind their own business. An old Chinese proverb says: "The open lips make the teeth shiver." When the defence in South Vietnam is broken by a total Communist invasion, if this ever happens, then Australia, in her turn, should feel isolated. And as a consequence, Australians will have to prepare to fight for the first time, right on their home land. One of the alternatives to this is that S.E. Asians and Australians must stand together in the struggle against Communism, and be united all the time, just to save ourselves, because something may come one day and we will find it too late to do anything.

So let us demonstrate our strength by Justice and Fraternity, let us become stronger, let us surpass ourselves and we will win.

MAKE STEEL YOUR CAREER



You will face wide horizons in your business career with the steel industry.

. . . Consider its vast plants and widespread manufacturing activities, its massive construction projects, its large shipping fleet, Australia-wide sales organisation and its impressive expansion which continually creates new opportunities at all levels . . .

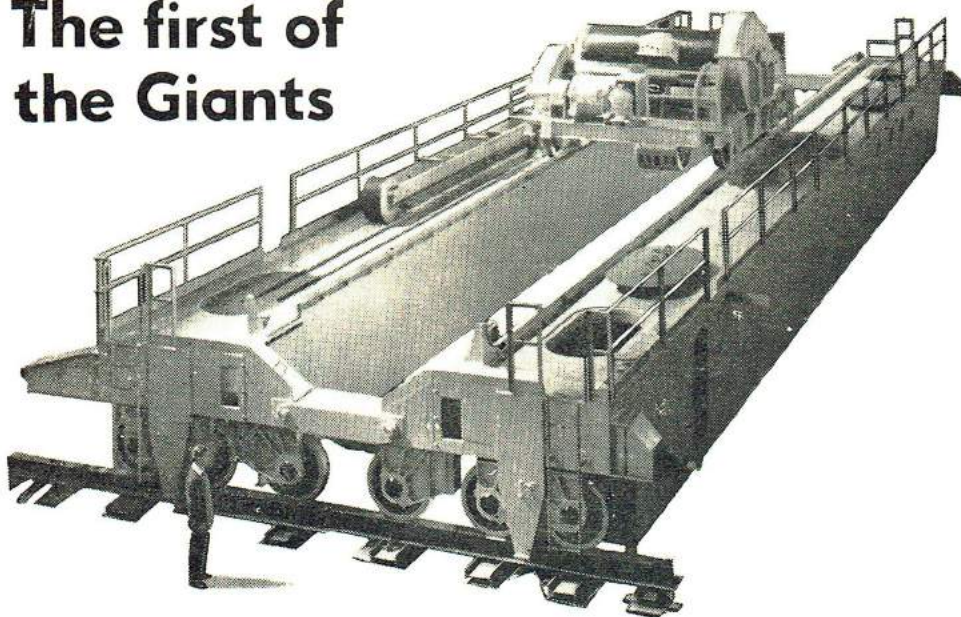
The Industry's comprehensive training scheme will give you thorough and personal training for responsible positions.

Call in to discuss your future or write to
B.H.P. Co. Ltd.,
168 St. George's Ter.,
Perth, W.A.



THE BROKEN HILL PROPRIETARY CO. LTD. AND SUBSIDIARIES

The first of the Giants



The first of three very heavy duty overhead travelling cranes built by Vickers Hoskins for BHP, Whyalla, South Australia. This crane of 100 tons lifting capacity weighs 335 tons.

Another two, each with a lifting capacity of 150 tons, weigh 400 tons. The contract for the 150 ton cranes was won by Vickers Hoskins in the teeth of world-wide competition. These are the biggest cranes of their type ever designed in Australia, being built wholly at the company's works at Bassendean. The contract for the 100 ton crane was awarded to Vickers Hoskins by Stothert and Pitt, Coates Pty. Limited, Melbourne.

To have won these contracts reflects great credit on the company's design and manufacturing capabilities and emphasises the versatility of the engineering resources of Vickers Hoskins.

VICKERS HOSKINS

PTY. LTD.

A COMPANY OF THE VICKERS GROUP

RAILWAY RARADE, BASSENDEAN, WESTERN AUSTRALIA

Ball of the Year

by P. J. Farr

For many years Engineering Students have been extremely proud of their Annual Ball. There are many reasons for this, not the least being the fact that it is the oldest of all Faculty balls, having been held without interruption for the last 44 years. It has become traditional for the engineers to stage balls which are remembered years afterwards for the elaborate decorations, student floor shows, and obvious signs of solidarity within the faculty.

During the early years of the Engineers' Club the ball was held in the hall of Shenton House, which was part of the old Engineering School. Since the completion of Winthrop Hall in the early 1930's the ball was held there annually until 1962.

It was during this period that the ball attained its high reputation for decorations. On most occasions a beautiful fountain was erected in the reflection pool, and being illuminated by spotlights, made an impressive sight for our guests on their arrival. Inside the hall a low ceiling was generally constructed of thousands of streamers, in a geometric pattern. A centred theme of topical interest was always chosen for the interior decorations, and the stage boasted a massive back-drop or cartoon.

However, many club members were not satisfied with the arrangements for refreshments. Due to an old decree, aimed at protecting the floor of Winthrop Hall, no drinks are allowed inside the hall. Hence, although in a state of great physical exhaustion following a short Modern Waltz, a man had to find his way (always hazardous) to one of the Common Rooms

in the Guild building to enjoy refreshments. In the comfort of an easy chair or settee he stood in great moral danger of either being seduced by his partner, or of staying there all night drinking to contentment.

Thus for many years attempts were made to have the ball held at another venue, where the drinking arrangements would be more convivial. On most occasions a solid core of final year students opposed the idea of a change on the grounds of the great traditions associated with the Winthrop Hall location. Their efforts were not in vain, and the venue remained unchanged until 1962.

Last year after long and heated debates at the Annual General Meeting and subsequent Special Meeting of the U.E.C., a motion was passed enabling the ball to be held at Canterbury Court Ballroom on June 15th.

The move proved to be very successful, the ball being superior in many ways to others held by the U.E.C. in recent years. The Ball Committee did a wonderful job in decorating the ballroom in the traditional manner, complete with an indoor fountain styled after the fountain in Kings Cross, and a "wheels" theme dominated by a large eccentric rotating in the middle of the ceiling and causing much instability amongst the guests.

The 600 people present had a really gay time and were most satisfied with the latest location of the Engineers' Ball. The U.E.C. showed once again that their ball is the Ball of the Year.

OVERSEAS OPPORTUNITIES FOR POSTGRADUATE TRAINING

by A. C. Beck

It is a common misconception among budding Engineering Undergraduates, that once they have obtained those two magic letters "B.E." behind their names, then the engineering world is at their feet. Unfortunately, however, this is not the case. After about six months out in the hard world of industry, the graduate invariably begins to realise that what he knows about "Engineering", lies approximately halfway between "precisely nothing", and "a little bit". In other words, he has still a long hard road ahead before he attains right to call himself Engineer. Hence, on graduating, he must ask himself:—

- (a) Which field of his branch of engineering offers most and appeals to him above the others?
- (b) From which aspect is he to approach it, i.e., research, design, development, manufacture, production or any of a large range of venues.
- (c) Where and how can he obtain a working knowledge of his particular chosen field?

It is in relation to this last point that the graduate must devote considerable attention and make extensive enquiries, if he hopes to receive an adequate and useful training, with which to ensure a secure place in the world of engineering.

It is an obvious and well-known fact that the facilities for the training and guiding of young graduate engineers in Australia is severely limited. This applies of course more to Electrical and Mechanical than to Civil Engineers, due to the limited industrial activity in these fields. Hence, it is necessary that for a better class of training, graduates in these fields must go overseas.

The following is a brief description of the type of training programme a graduate might

expect in a large British manufacturing organisation. In actual fact, this is the training which most English Engineering Graduates must undergo before a firm will employ them as engineers.

The "Graduate Apprenticeship" as it is called, usually consists of one to two years of intensive training in industry, in all phases of the graduate's chosen field. Periods of two months or more are spent in each of the sections wherein he and his superiors feel he can apply his technical training to obtain a useful working knowledge. For example, he may decide to specialise in large electrical machines, in which case he would spend time in the associated Production Control Office, Assembly Sections, Engineering Drawing Offices for design experience, and perhaps the Research Departments to familiarise himself with methods of development, and new ideas in design.

A large variety of postgraduate courses are usually available, both in the companies and in outside Technical Colleges, whereby more specialised academic training may be obtained. For example, the AEI (Manchester) Group, has series of lectures on Mathematics, Physics, Power Systems, Communications, Control Systems and Electrical Machines, run, and delivered entirely by its own staff, followed later in the course by two month full-time courses at the Salford Technical College on the last four topics. The full facilities of the firm are placed at the disposal of the graduate, and one course available, covers programming and use of the "Mercury" digital computer, during which the firm's own Mercury computer is available for practical experience. This is an invaluable, almost unique opportunity which would be difficult to obtain elsewhere.

A period of three to four months is spent on "Outside Construction", whereby the trainee

Performance, Precision, Power

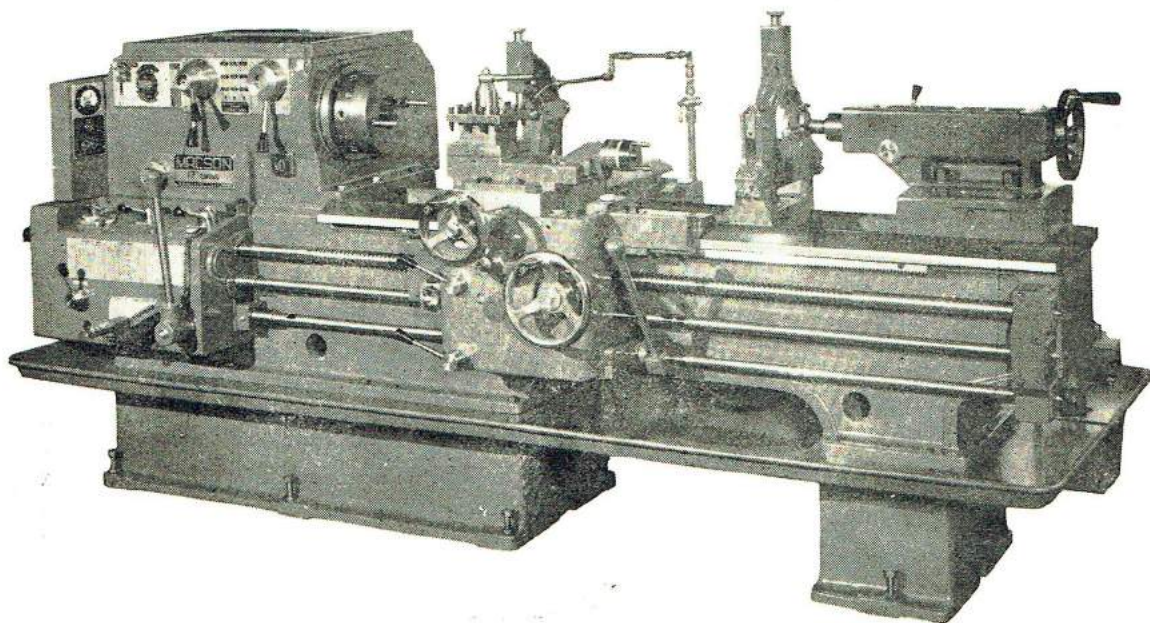


Illustration is of the popular 18in. swing geared head lathe which can be supplied in either straight or gap bed and with roller bearing headstock. Send us your enquiries, and we will be pleased to send you full particulars of these up-to-date lathes.

MACSON LATHES

Made in: 14"/16", 18"/21", 22"/25", 26"/31", 32", 38" and 43" SWING

Several sizes are available with hydraulic copying equipment.

Manufactured
by



Melbourne,
Sydney,
Adelaide,
Brisbane,
Perth.

532 Murray Street, Perth, Phone 21 9711 or 21 2561 (15 lines). Telegrams "Wes'mac"

is employed in commissioning or construction on some major project with which the company is associated. Such projects are the Nuclear Power Station at Dungeness, the new West Thurrock thermal station, the massive R.T.B. Steel Rolling Mill in Wales, and the many hydro-electric power stations in Scotland. Limited opportunities also exist in exchange systems between continental companies.

The idea behind these schemes is to enable the graduate to get the most out of his "non-productive" years immediately following Uni-

versity training. During this time it is hoped that in seeing enough of his field of study, he may be able to choose as early as possible, where he intends to specialise and thus enable him to take a useful part in the profession.

In conclusion, it may be pertinent to point out that training of this type, overseas, in another country and society, is most beneficial in broadening the outlook and increasing the ability to deal with people and situations typical of which the Engineer is likely to meet later in life.



AUTOMATION IN THE UNIVERSITY

It is said that some universities in America are experimenting with "teaching by machine".

An automatic lecturer!—What will they think up next?
A fine precision instrument, when talking round "the text",
He thunders from the lectern and he sparkles at the board,
And serves the student audience with treasures from his hoard.
Deriving motivation from a neat atomic pile,
He's easily adjusted on a calibrated dial:
Agreeing with his students (whatsoever they dictate)
When fed with resolutions on a perforated plate.
By quite an elementary adjustment of a wire
He's high—or low—or middle-brow (whichever they require):
And since his teaching modulates by turning on a knob,
In matters highly technical he's really just the job.
The Bursar's quite delighted that his monthly payment rate
Is permanently stabilised at 1958:
Administration officers appreciate him most
For here is a phenomenon who answers all his post.
We've had a long succession of eccentrics and of spikes,
But now we have a lecturer whom everybody likes:
And all await the future of mechanical research
When automatic lecturers won't leave us in the lurch.

Adapted by "ONE OF THEM".



POST-GRADUATE OVERSEAS SCHOLARSHIP

The Shell Group of Companies in Australia offers a scholarship (which carries no bond) of £E850 per annum for two years tenable in the United Kingdom for post-graduate work in Engineering or Science. The scholarship is open to male British subjects, normally under 25 and unmarried, who have taken with honours a first degree in Engineering or Science and preferably have had one year's experience in research.

The final selection will take place in Melbourne in December, 1963.

Prior to the closing date for applications, October 31, 1963, details, conditions and application forms will be available from The Shell Company of Australia Limited in Perth or the University Registrar.

Captain

assures

parties

Success

- DRIVE-IN BOTTLE & KEG DEPT.
- SUPERB DINING FACILITIES
- GAY COCKTAIL BAR & LOUNGE

THE CAPTAIN STIRLING HOTEL

John Grosser, Licensee

86-3348, 86-4977

AN INTERSTATE

MUGGA HUNT

by "Brig"

The hunt began immediately the ill-fated Westland left Perth Railway Station on the night of the 8th September, 1962. The complement consisted of eighteen Fourth Year hunters and a head hunter and guide, "the Prof", an experienced hunter from the jungles of the London underground. After years of study the men were eager to put theory to practice and we felt assured of many handsome bags of Muggas so long as our ammunition lasted.

Large stocks of ammunition were taken on at Spencer's, Merredin and Kal. This foresight was well founded as king-size Muggas were seen in large herds on the Nullarbor, and most hunters caught good hauls during the evening. Unfortunately the hermetic sealing of the train could not be broken and thus the successful hunters were prevented from disembarking to collect their kill.

The young hunters warmed to their task and soon learnt the subtle difference between the Mugga and the Mugger; the latter being a protected beast in most States. This new-found knowledge served us well when in Whyalla only the Mugger abounded—Muggas having been shot out ruthlessly by the last Gledden Tour.

Extra-curricular activity at Whyalla included a visit to the B.H.P. steelworks and shipyard. A visit to the town's model dairy provided some enlightening methods of milk and re-production, this appeared to be the social centre of the town. We also visited a salt farm, the produce of which is used in making West End.

A quick reconnaissance of Iron Monarch and Iron Baron shocked the members when it was seen that mass excavations and blasting had virtually destroyed the excellent Mugga sanctuaries that formerly existed there.

In Adelaide the widespread dearth of Muggas amazed even the head hunter; and this was

attributed to crows having ravaged the countryside and eaten most of the young ones—leaving only the inedible and protected beast the Mugger. Hunting seemed doomed when restricted trading hours made the acquisition of ammunition very difficult. However, as game was scarce we were not really perturbed. We paid homage to the Gresham crash-house and members will be relieved to know that Sav. has left.

A short diversion in the form of a visit to the Adelaide University proved one of the most interesting of the whole tour. We were lucky enough to have afternoon tea with some Adelaide hunters who had some sport organised for us that very night. The Adelaide branch treated us to some fine well organised sport that evening, and with almost unlimited ammunition most of our group looked forward to success. Some fox terriers were also sighted here for the first time. The enthusiastic Adelaide branch warned us of another hunt to be held the next evening before the train left for Victoria. This was well worthwhile although Pem and Ants lost some of their ammunition in their race to catch the train.

The overnight trip on the train to Melbourne was very restless for all, especially one of the number who unfortunately was inadvertently locked in the same carriage as about 50 female hunters, all of whom were yelling for blood. A skeleton key designed to fit any train in the Commonwealth at last saved the night.

On arriving in Melbourne in typical overcast weather most men decided to spend the free day at the M.C.G., although two hunters had to report to headquarters to discuss strategy for the rest of the trip. Melbourne was found to be a good hunting ground as these two took all day to shoot out the city block. That evening the well-armed complement finally boarded the Aurora and we set off bound for Sydney.

salutos mes amigos

prosit

Welcome to

Steve's

. . . The perfect rendezvous for Engineers-to-be
for a convivial beer over a game of Skit-La
or perhaps just a quiet and relaxing drink in the
Alfresco lounge with its magnificent river
and garden views.

The Nedlands Park Hotel

86-1340

Hazel J. McHenry, B.A., Dip.Ed.

skal

bon sante

proost

Jacksons Drawing Supplies

148 WILLIAM STREET, PERTH

PHONE 21 7853

***Full Stock of all Drafting
and Drawing Equipment***

SPECIAL STUDENT DISCOUNTS

The executives of the newly-formed Sydney branch met us at Central Station and showed us around the vast city centre. They told us that a hunt had been organised by the branch for the evening, and we appreciated this warm welcome accorded us. The afternoon was spent inspecting the sporting facilities at Manly, Kings Cross, Harbour Entrance, Newport and



Inspecting sporting facilities at harbour entrance.

Nebo Colliery and a great deal of game was sighted, although we were under strict supervision and could not venture into likely hide-outs. In the afternoon eighteen hunters, the head and Bill the bus driver, a very experienced hunter from way back, journeyed through the mighty hairpin bends in the MacQuarie Pass and on to Canberra.

The Canberra branch is largely inactive because of political control, and what could have been a good hunt was interrupted by the Commonwealth Police who very selfishly did not agree with us shooting their game. The Australian National University was deemed by all to be most impressive and the luncheon in Bruce Hall was greatly appreciated.

Onward to Cooma, heart of the S.M.A., and the snowbound Mugga quarters of Australia. A most enjoyable night was spent in Cooma with some older folk from another tour, including a well travelled London lady whose repertoire of off-colour songs astounded and amused all present.

The next day the S.M.A. opened their arms to welcome us and this warm hospitality characterized our most enjoyable stay with them. Apart from some fine engineering works well known to all, this proved to be excellent Mugga country, especially in the snow areas. Bill Todd, the driver, knew these parts well, and took a number of us on some well conducted hunts each night. Ammunition and game was plentiful and this rugged country provided us with some great sport.

A free day in the snow—all had tried skiing on the gentle slopes around Guthega Dam the previous afternoon, and this day was the event of the tour for most, including Tom who found himself face to face with a huge Mugga in the bottom of a deep crevice; Mick and Prof who vied for the title of "smoothest on skis", and a few who spent most of their time on the ground.

In the afternoon two of the hunters ventured to the top of the slope and just managed to ski to Sundeck where a great hunt was organised for that night, which unfortunately for them they couldn't attend. Another variety, the fox terrier, was discovered, patented and examined at close quarters. The Alpine horn sounding in the valley announced the end of the day's

Pittwater. Members came to the conclusion that the cliffs around the harbour were very old Mugga tribal rite grounds as many bones and relics were found. This provided one of the most interesting and worthwhile daylight hunts of the tour, and was packed with historical interest. Also two pedigree Muggas were captured in Kings Cross and taken back to the Manhattan where we were staying; Wayne and Ken had good reason to be proud of their haul.

The evening was most successful as a large variety of ammunition was available, and as the hunt was held in collaboration with some hunters of the opposite sex many interesting topics were raised and most caught good bags.

After quite a bit of extra-curricular activity at C.S.R., Email and Australian Consolidated Industries and some very interesting evenings it was decided to go south to look at the newly-opened sanctuary at Wollongong. The happiest event for most was the arrival of the results of the Mugga Hunting Theory exams; in which none of us failed outright, though a few had supps to do.

Half a day was sent underground at Mt.

sport, and the two absconders reluctantly slid and stumbled knee deep in snow down the long slope to the bus waiting patiently below.

After quitting the Snowy with a good batch of game we made for Victoria overnight.

We found Yallourn and Morwell bad hunting grounds, especially on a Sunday afternoon



Tactical discussion on forthcoming hunt with a local inhabitant from SMA.

and decided to move to Mugga headquarters at Melbourne for better sport.

After five days of relentless extra-curricular activity and night hunts in Melbourne most of us settled in the train ready to sleep all the way home—well satisfied.

Footnote: For the uninitiated.

The Mugga is a cross between a Bunyip and a flight of imagination.

Its features vary with climate and the topology of the surrounding country. The Mugga easily adapts itself to changes in climate and terrain and is a very intelligent animal. Thus it requires four years' hard study to learn how to stalk this wily beast.

Research is at present being carried out on their living and breeding habits, as very little is known about this.

References:

- (i) The Beast in Me and Other Animals.—James Thurber.
- (ii) Things One Would Have Rather Left Unsaid.—London Punch.
- (iii) The Gladden Tour Report, 1962.

THE DEATH OF A GREASER

*A handsome young greaser lay dying,
And as by the turbine he lay
To the lecturers gathered round sighing
These last dying words did he say:*

*"Take the rotor from out of my kidney,
The computer from out of my brain,
The slide rule from out of my nozzle
And start up the turbine again.*

*When the convocation assembles
Please tell them the reason I died
Was because I forgot that a turbine
Was a dangerous place for a ride."*

*The petal was blown to pieces
Every little golden lock of her hair,
But it made quite an interesting thesis
This account of a centrifugal affair.*

*Her jaw clutch was rather distorted,
Her couplings were all out of place.
They were rather surprised that he courted
A lass with a parabolic face.* —I.G.D.

YEAR NOTES, 1962



FIRST YEAR

School teachers, professors and the general public are for ever expressing their views on the large gap between the Leaving and the University.

No one has any idea of this gap until they actually experience it, and life at Uni. is a real experience.

No one wants to hear me raving on about studies and study so we'll only discuss the lighter side.

The first event was the initiations. Armed with 200 packets of flour we arrived expecting the worst and proceeded to get it.

Owing to the fact that this publication is for sale we can't go into the details, but two hours and two bottles of paint remover later we were starting to feel human again.

Next came the Aquatic Carnival or grog show depending on how illiterate one is. Terry (Tex) Allen the first year rep. upheld the tradi-

tion well. At one stage he was making 30/- a day sculling at the Athletic Carnival in Geraldton. As a matter of interest Tex is not with us in 1963.

John Birney majored in billiards, closely followed by cards and social studies. His mate N. Bower went one better and passed with 3 A's and 2 B's.

Cliff Harris entered his car for Prosh and succeeded in burning one pint of flushing oil every half mile, much to the disgust of the W.A. Police Force.

Dave Clark attended lectures for a change (both times) and shocked every one by passing. The same goes for Peter Stewart.

Although I have been mentioning some of the passes—there were lots who didn't, and seeing I am there again this year I consider it advisable not to mention any names.

My parting advice to anyone thinking of taking up Engineering is "Don't".

Signed: A Repeat.



SECOND YEAR

Why write year notes? Everyone is trying to forget the long hours spent in glary lecture theatres and those hideous lecturers (especially from non-Engineering departments). But they present a chance, I suppose, to let the world know how we shone among the pale, sickly scene around us from Freshers with their classic inferiority to the fifth years whom we thrashed in that mid-year match. Our pride and strength was our unity. We were never too busy for balls, parties or shindigs and turned up in force—that solid core of stayers that lasted to the end.

Freshers' Ball was the first event of the year. We made fame with our speed trials in the Reflection Pool. Can anyone beat half an hour from end to end? This was followed by the typical get-togethers during those leisurely days of first term. Best of all was the stag dinner because we organised it. Our Prosh float deserves a note for the record as it was extravagantly bedecked with mammoth cans and film stars, rollicking singers and he-men. Second term was full of balls and we can almost remember all of them. The Club Ball and the Cabaret would perhaps rate best but there was another that drew quite a mob despite the exam next day. Third term was marked by the Dinner,

a great show with some dynamic speeches for a change. We wound up the year with a pre-exam "do" that was so successful that it extended into the middle of swat vac—from two right through and the exams seemed years away. Need I mention how we enjoyed ourselves on Guy Fawkes and that trip to Rotto?

Those swell guys: who can I mention first? That lovesick Coops rates preference in size, but Phil and Tub are pretty close runners-up. Arab was conspicuous for his early arrival at lectures and exams but Simon holds the record at twenty-five to ten. (It was my number-plate—it fell off!). Brains, of course, aren't important, but just for the record Mol has got them—98% in that exam after the ball. Garry H. made us green with envy for the Victorians, but Cyril's yarns were good—he enjoyed them anyway! Dave was open champion at squash, though I believe Frank was a step above our class again. Then the rest of them—dapper Cockles, P.J. the first man to be hooked, Hughman the humourist, Trevor, Ed, Blackie, Nick, Tang and so on down the long list—were all outstanding, or remembered from some occasion. We were a great mob, and will make greater third years.



THIRD YEAR

Third year lined up for the year separated into their respective departments for the first time. A conversation overheard at an end of vac. reunion went something like this:

Civil student: You've got to admit it fellows, we Civils led the field in the social activities despite the sadistic Prof. Prider who arranged Geology exams the mornings after the socials. Why we were in the initiations, car trials, Symposiums and the other grog-ons as well.

Mech. student: Who are you kidding! We were far more social minded. Why we had one chap who kept his romance alive by riding his scooter to Collie every weekend even in the depths of winter. He claims that the latest news in the marriage stakes is that his odds have shortened from 1000 to 1 to 20 to 1. Also, what about Hong who was really proud of that six inch stitched cut in his head, seems he forgot to duck at the crucial moment in a Chinese sword dance.

Elect. student: You fellows are only pulling your own legs! Why, we were the ones to the top in the social field, what with the ball floor show and Harry even went mad and married the girl.

Other two: O.K. you win, but what about the other fellows, anyone worth mentioning in "Non Loqui"?

Civil: Well, Kerry Wark and Ian Fawcett showed more aptitude at golf than geology prac. but Alessio Formentin should be a great structural engineer if his on the spot stress analysis of the infamous Third Year Prehistoric Egg "Look out you blokes, it's going to break!"

Mech.: Ugh, you reckon that's smart; we had one fellow give a thermodynamics seminar "The Advantages of Camel Dung as Fuel for Gas Producers".

Elect: What no competition! Why we had a great competition between Bob Paget and Jeff Olivero for the late-comer's crown. Bob won with some brilliant 20 min. and many 10 min. late arrivals. However, I think Niel Crosby should be given a high place for his more spectacular entries, viz., his nonchalant stroll into Prof's lecture only 10 mins. late, amid crashing silence, and his somewhat more noisy entrance into a couple of J.H.B.'s classes when J.H.B. was obscured by students. Niel also showed great fortitude in being able to get out of bed at St. George's at 8.45 and be in the lecture room at 8.59.99 in the morning.

Civil: What about prac. classes you fellows? The less said about ours the better.

Mech.: Well a group of League standard football players resulted from expert coaching and training during Tuesday afternoon Drawing Office.

Elect.: Ours were pretty tame too except for the occasional blast of radio station from the hetrodyne voltmeter.

All: What about us producing a list of lecturers for the "Non Loqui" notes?

Civil: Well, I've already mentioned Prof. Prider's sadistic streak but there was:

Mr. Reynolds, either wouldn't give the text he gets his theory from or hasn't written it yet.

R. Sacks, his soloquy on the theodolite did credit to Shakespeare.

Bev. Smith, Structures prac. interrupted his morning tea break. Whilst the worthy Doctor had only one salt water filled ping pong ball returned.

Mech.: Well, I can only mention two without getting the editor into trouble, they are:

Dr. Jack, the only member of the entire University staff who could lecture for 45 minutes on nothing and send no one to sleep.

Hunks, had the amazing idea that the problem was completely solved by repeating the question verbatim.

Elect.: All was peace and serenity our way, too, but there was:

Doc. Fall, blamed his two black eyes on the Prof's squash racquet!

Dr. B.leary, almost disappeared at times into the tent he wore as a jumper, also spent time in hospital as the result of a game of squash. I hear the entire Electrical staff are taking up tiddly-winks!

J.H.B., was rather sneaky getting his Ph.D. in the long vac. so the students couldn't join the celebrations. Congrats. anyway. Results of Longest Lecture Competition conducted in the Elect. Department:

1st: Dr. Fall—1 hr. 40 mins.—a great effort, worthy of high praise.

2nd: J.H.B.—1 hr. 20 mins.—looked a certainty until Dr. Fall's effort.

3rd: Prof.—1 hr. 10 mins.—pre-season odds-on favourite.

All students agreed that all things considered it was not too bad a year and hope that all future third years pass into a more enjoyable fourth year.



FOURTH YEAR

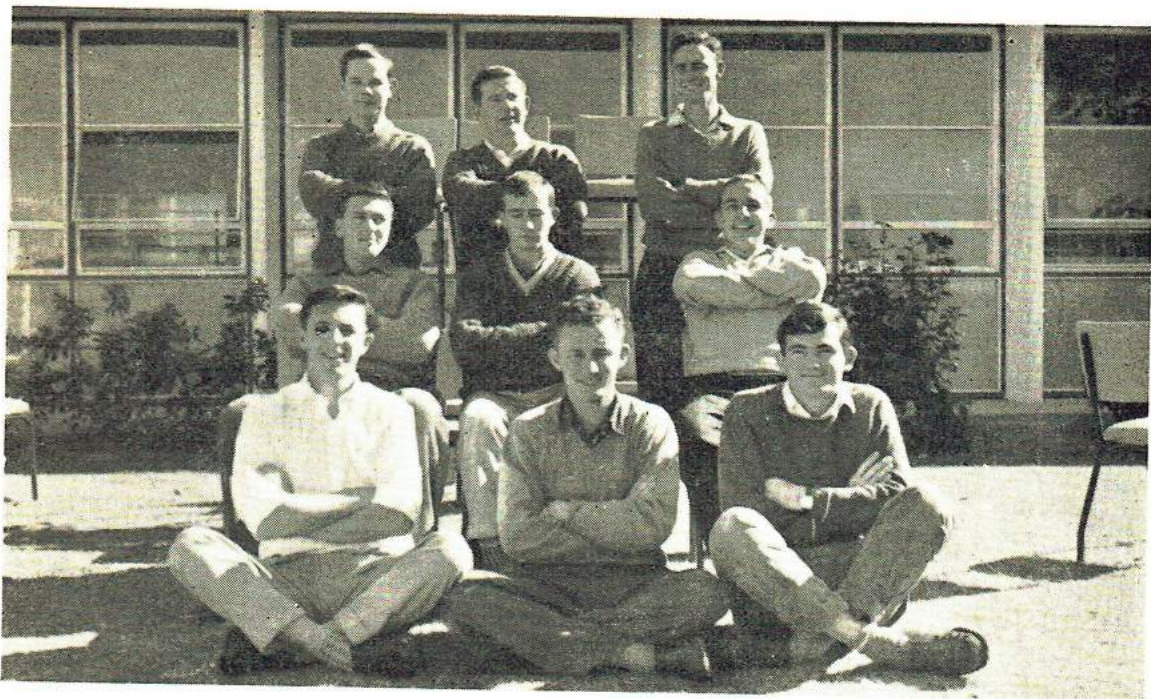
Civil

"Experience is essential for good Engineers" was our motto as a solid eleven assembled for the two terms. Six of the eleven had done the long course at this stage. We had our bright boys too. Young Bob Wark who always wore a jumper and shirt in that order, and Bomber Brindley, ace hockey player and smoker from the Hostel.

We had West Perth's best supporter, Mirko Drolulich in the side to give it solidarity (about 16 stone). Invaluable as football instructor. Laurie Humphreys was wanted by the Commonwealth after his experiences at Bunbury

and other places. He had a supper at Mr. Sack's expense.

Jim Ryan became quite well known. His trips down from the country increased to about 3 or 4 a month and it was generally believed he lived at St. George's occasionally. The P.W.D.'s famous trio Jack Ffarrington, Brian Grainger and Stan Elson were prominent throughout. Stan showed his talent with the ball fountain. It was believed that Brian and Jack were rescued from the great Hydraulics Lab flood of '62 by Roy Penberthy, then secretary of the concrete boat brigade. Roy is at very short odds



for President, being an executive of amazing experience. Roy believed that the first 10 minutes of a lecture was not the real essence of knowledge and used to arrive only after the class had settled down.

Mick Wallwork ran a very successful footy pool—he shared the winnings. Several bad injuries kept his football career at a low mark.



FOURTH YEAR

Mechanical

There was movement on the campus for the word had passed around

That the Thirds from sixty-one had got away,
So all the lecturers had gathered to the fray.
All our tried and noted men of origin near and far

Had mustered at the Nedlands overnight
For lecturers love hard work where the wild
Fourth Years are

And we would not submit without a bloody fight.

It was just before the start of fifth year that we learnt of the tragic death of one of our classmates, John French. Capable, straightforward and cheerful in the scholastic and sporting fields, his absence is and will always be deeply felt by all who knew him.

Needless to say all passed and we look forward to a similar result in '63.

There was Ants, who made his mark where
Cottage parties kick;

A young colt from B.H.P. who really let us know.

Now few could hold their own when the bull was flying thick

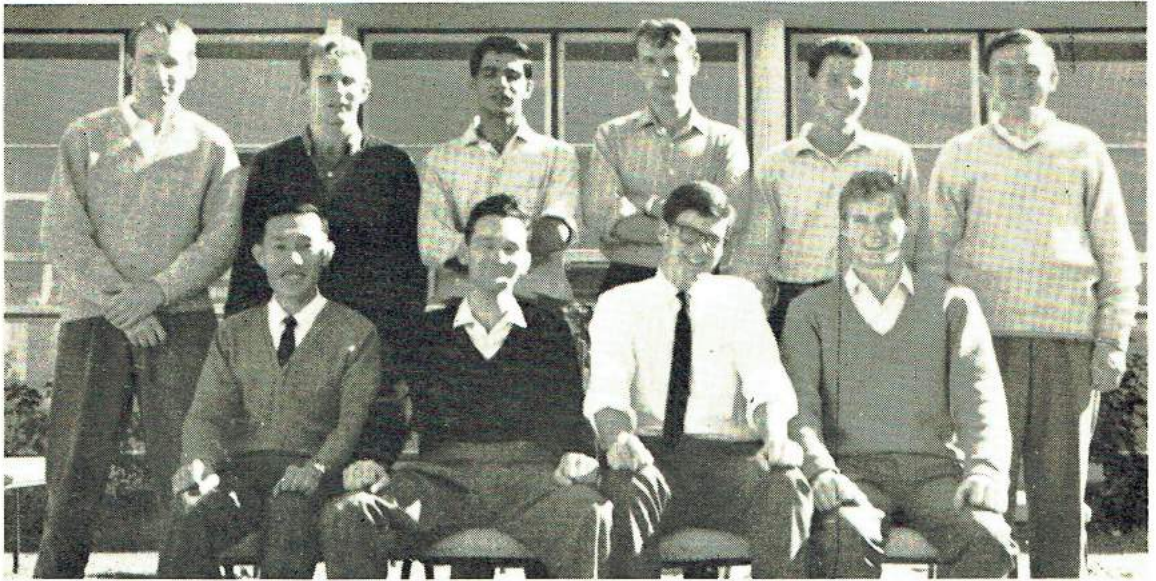
For Ants can sling it well when he really has a go.

And Ken from Cuming Smith's came back to lend a hand

No better draughtsman ever held the scribe
Not even Doc Hunka disputed him—his plumber block was grand

He had long ago learnt to take them in his stride.

And young Dick was there—one would doubt his power to stay till Eve



Then old Bri said "You'll never, never do—
For a gruelling game of squash m'lad; you'd
best sport a time at Steve's.

"The game is far too rough for such as you,"
And John lingered, sad and wistful—but only
Rocko the Quick stood his friend

"I think we ought to let him come," he said;
"John's beloved spouse and my fair maid keep
calling to the end;
And now we can enjoy the houselife in the
'stead."

He hails from Safety Bay down near the Cock-
burn Sound

Where the surf is twice as steep and twice as
rough

Where many a sleek yacht whips foam from the
waves in every bound

That's Mick, a crafty mariner who's tough.

When we reached the merry tavern, even Vic
could use a draught

Well might the boldest bate their breath;

For hops flowed freely for the quench 'till e'en
he became too daft

How his Guardsvan flew; any slip meant death!

Syed was right amongst the best as we sped to
nearby pub;

Amazed, for with demon scooter had he vainly
toyed,

Saw him ply the throttle fiercely: gave a bus a
nasty rub—

His absence from metalls. being noted by the
Lloyd.

We lost him for moment where two ranges rise
and meet—

On the Getaway—but a final glimpse reveals
On a dim and bloodshot hillside the wild men
kicking yet,

With that Uni parking man following on their
heels.

Bobby and Pete worked single handed till their
sides were white with foam;

They followed their work spot on the track,
Till Steve's ran dry, bone dry, and we turned
our heads for home

To restore the knowledge lost during vac.

And over East, where the Gledden Tour rang
praise;

Of torn and rugged battlegrounds on high,
Where the atmosphere is heavy, though the
night lights fairly blaze—

At midnight in a warm and lusty dive

And now around the campus where the Fifth
Years swagger and sway

To subtle praises—of fresher-ettes all innocent
and bright eyed

The yarns of old Fourth Year Mech. are heard
again today.

As the wild men of sixty-three can reminisce
with pride.



FOURTH YEAR Electrical

WAYNE set a new fashion with his yellow cardigan. Excelled with his 18-page report on B.H.P. I wonder why? Women troubles and expectations (fulfilled) for the Gledden Tour caused W.F.B. to sit for his usual second round in January. Wayne says supps are necessary to really understand the work.

PRED showed great form in Comm. 1 prac., this apart being due to avid reading of Radio, T.V. and Hobbies during Surveying in 1961. Peter cunningly took ill prior to the September exams and thus had them postponed until January. Although Cathy was G.I. for most of 1962 they are now happily engaged.

IAN is best remembered for being Secretary for U.E.C., for his subdued behaviour on the Trans Train, his ski-ing (or she-ing) at Sundeck, and subsequent picturesque return journey with Dick to the Pioneer Coach. Ian's experiences in Sydney and subsequent trip to Cairns during the long vac. are also rather interesting to listen to over a glass of cold water.

RON spent most of the year trying to work out the relationship between the Rationalised M.K.S., the C.G.S., and the Unrationalised

K.W.T. systems of units. His complete solution did not appear until February. Ron and his wife once again spent the long vac. in S.A. A good man for fixing motors and fuses in the lab.

RICH HARTLEY, despite continuous protests about the difficulties of married life, produced some good exam results in September and November. His child, which arrived in August, was born with a water cooled slide-rule, and shows unusual promise for one so young. Has a flair for dramatisation that extends to the half-breed element.

ALAN spent most of the year looking for a job as a lighthouse keeper, and a wife (no cooking experience needed) to keep him company. Being unsuccessful in the above Alan settled for the Gledden, but unfortunately had to miss C.S.R. (Sydney) due to a liver complaint.

NOEL nearly didn't reach the altar after Gail heard of his trip to Melbourne in May. Nevertheless they are now happily wed and Noel regrets that he didn't marry years ago. A member of the P.M.G. Basic and Fundamental Research Team with P.R.E.D. and P.J.F.

WARREN had his usual successful year finishing with two trips to the well loved East. His highest innings for W.A. was scored after a particularly heavy night in Sydney with I.G.D. During the year he traded his well worn Puch

for a quieter and more reliable Lambretta. Warren now arrives on time for lectures.

HARRY—dart thrower extraordinary, was easily recognised by his neat appearance (including rumpled khaki shirt), and punctuality for Doc. Leary's Friday morning lecture. One quiet night in April his car was hit by a wandering lamp-post which happened to be disguised

as a Dragon of St. George. Harry sojourned to Adelaide in November to contemplate his future.

TOM: on the Gledden—Tom had a girl in every port; but with typical cunning guile he always managed to get away unscathed. Although a fine Mugga hunter when fit he was unfortunately hampered by knee and thumb injuries during the hunting season.



FIFTH YEAR Civil

After 4 years learning how to relax, we lined up for the final year to put practice into theory.

Our thanks go, of course, to the example shown us by the lecturers, notably Jungle Jack Harvey, Smithy, Big Jim Espie and "Hard isn't it?" Reynolds. So obliging were these gentlemen that towards the end of the year they enabled us to start our weekends on a Wednesday.

A brief account of the individuals gives a good idea of the year's work.

Wise Ones

Seldom seen or heard Smithy—managed to clock up 30 minutes lecturing for the year. He

paid little regard to his health during the Bunbury tour, and needless to say it failed him.

Big Jim Espie—noted for his unsupervised exams, explained by his comment, "If you want me at all, I'll be over with the typiste." Gets full marks for managing to get his lecturing done for him by outside lecturers.

Jungle Jack Harvey—we are deeply indebted to this gentleman for his patience in showing us at every opportunity, how to read a graph.

Mr. Reynolds—his radical approach to structures left conventional methods and his students for dead.

Unwise Ones

Bob Bunning—too much work and no play makes Bob a dull boy—this was his contention, which he carried out by arriving for lectures 10 minutes late—everyone present but Bob was

considered to be a full house by the lecturers. He casually slid through the finals and is believed to be working in the family business.

Chris Calder—P.W.D. Cadet now employed on the construction of the Logues Brook Dam. Unfortunately he is addicted to card playing—some of his successes being at home, some between and during lectures, and some with the nurses at Bunbury.

Bev. Campaign—a pleasure to teach—he combined year round surf board riding between lectures with A class assignments. A M.R.D. Cadet, he now finds himself employed in Derby. Rumour has it, that this has curtailed his extra curricular activities considerably.

Chris Fisher—Now employed in a local structural steel firm—he managed to hold his position in the King's Cup crew despite his indulgence in beer, cigarettes and women—is renowned for his skill in driving the green machine—a vehicle with rear wheels offset 2 feet from line.

Mick Hodge—has found employment with a contracting firm on the Standard Gauge Railway. Academically successful despite his failure in understanding Jungle Jack's comprehensive course in graph reading. Has always set the

pace for study of practical hydraulics at Steve's.

Mick Hertzfeld—renowned for his ability to remove relevant books from the library within 30 seconds of a lecture finishing—he also wins first prize for the speed and stamina he showed on the South West Tour in clipping on and off his safety belt 300 times each day. Mick also is an employee of the M.R.D.

"Charlie" Ong—with typical oriental cunning, Charlie has concealed his name for years—nevertheless "Charlie" he is to us. A perfect gentleman, his only blemish for the year was in delivering his Seminar in his mother tongue. After passing the finals, Charlie slid into obscurity and vanished without traces.

Mick Parker—must be given full marks for doing the course during lectures—thus leaving much more time for the pursuit of more interesting things. A W.A.G.R. cadet, his time is now split between getting married and railway construction.

Richard Stone—Dick's heavy social commitments left him little time for study, yet on the whole he managed his affairs to advantage. He is now employed on the construction of the Alcoa refinery at Kwinana.



FIFTH YEAR Mechanical

"CLASS OF '62"

Fifteen tried performers faced up to the barrier in the final event of the pentathlon. All finished, although a couple tripped near the finish and had to be assisted to the line by newly won wives-to-be.

A glance through the list will quickly show that there was a crack field. "Fielder" writing in the "Sunday Splash" has this to say:—

1. Cooney, John

Married + 1. Had to marry a nurse to look after his child. Quitted George's brandy. Set up house in a strategic position mid-way between Uni and Steve's. Finish-

ed his 8 year marathon in a tired A30 with an outstanding performance—good stayer. Now with Mobil.

2. Hill, Geoff.

Married. Blasted his blasted way to 1st Class Honours—the noisiest man in the field. Re-introduced the class to the honourable game of doogs. Gone to Ford's.

3. James, Laurie

Married. Cunning fellow ensured cheap books for self by marrying a woman from bookshop. That's the last we've heard of him, but believe he drove to Sydney in his powerful Morris Minor—suspected to be having a good time there. Another good man gone. An English Electric man.

4. Jeanes Bruce

President of the Club, and used the privilege to turn up late to all but 5 lectures—

***These boys need no photograph
as we well know how handsome
they are***

Ed.

3 of which he missed anyway. Pulled a rabbit out of a hat during a cyclonic seminar. Paddles a mean tub and manages to look dashing at the same time. Studied for exams at Cuz's flat—hence supps. Helping Warman's out now.

5. *Lefroy, George*

Worst bonanza player in class, interested in hot water. Persisted in insisting he was right—when he was—simply not done at Uni. Asked intelligent questions and belched when disgusted. Took out 26 women in first 26 weeks of term—each one once only—and still managed 1st class. Sticking around for an M.Eng. Sc.

6. *McGann, Peter*

Bonanza player. Drove an A40 on at least two of its wheels. Top ocean going power boat man and car trial contender. Turned 21 during his 5th and final year at Uni—no mean feat, even the staff celebrated. Looking for a “good” job.

7. *Manchester, Roy*

Another bonanza player. Flew an Austin 7 and sundry other aircraft. Having knocked the road at Uni for 6 years, decided to do finance in Hot Mix and fill up the holes. About time he got engaged.

8. *Mitchell, Neil*

Married. 1st Class Honours, now on his

way to becoming top man in Warman's of “Export Action” fame. Thorough gentleman, but you never can tell with quiet types. Disgusted the class by scoring 98% in one of the papers in Mech. III.

9. *Rock, Graham*

Married plus 1. Another 1st Class Honours man. Hard worker and hard talker. Now got his wheels firmly planted, and is kicking on for a Ph.D. Top marks for his marathon seminar.

10. *Rollinson, Ted*

Bonanza champion. Married plus 3, but insists there'll be no more family for a while—has finally come across a system that works. Now trying for the big bang with Atomic Energy. As well as being a birth control advocate, is also a top golfer, hockey player, cricketer, baseballer, etc.

11. *Rozenthal, John*

Hermit, unmarried. Great artistic talents much appreciated by ball managers, etc. Liked boats, and gave a seminar on them in a mixture of English and Ukranian—complete with accents. Now with Dept. of Works.

12. *Skinner, Roy*

Engaged—another good man gone. Leading bonanza player, top organiser, and micro-writer. Reputed to have the best

considered to be a full house by the lecturers. He casually slid through the finals and is believed to be working in the family business.

Chris Calder—P.W.D. Cadet now employed on the construction of the Logues Brook Dam. Unfortunately he is addicted to card playing—some of his successes being at home, some between and during lectures, and some with the nurses at Bunbury.

Bev. Campaign—a pleasure to teach—he combined year round surf board riding between lectures with A class assignments. A M.R.D. Cadet, he now finds himself employed in Derby. Rumour has it, that this has curtailed his extra curricular activities considerably.

Chris Fisher—Now employed in a local structural steel firm—he managed to hold his position in the King's Cup crew despite his indulgence in beer, cigarettes and women—is renowned for his skill in driving the green machine—a vehicle with rear wheels offset 2 feet from line.

Mick Hodge—has found employment with a contracting firm on the Standard Gauge Railway. Academically successful despite his failure in understanding Jungle Jack's comprehensive course in graph reading. Has always set the

pace for study of practical hydraulics at Steve's.

Mick Hertzfeld—renowned for his ability to remove relevant books from the library within 30 seconds of a lecture finishing—he also wins first prize for the speed and stamina he showed on the South West Tour in clipping on and off his safety belt 300 times each day. Mick also is an employee of the M.R.D.

"Charlie" Ong—with typical oriental cunning, Charlie has concealed his name for years—nevertheless "Charlie" he is to us. A perfect gentleman, his only blemish for the year was in delivering his Seminar in his mother tongue. After passing the finals, Charlie slid into obscurity and vanished without traces.

Mick Parker—must be given full marks for doing the course during lectures—thus leaving much more time for the pursuit of more interesting things. A W.A.G.R. cadet, his time is now split between getting married and railway construction.

Richard Stone—Dick's heavy social commitments left him little time for study, yet on the whole he managed his affairs to advantage. He is now employed on the construction of the Alcoa refinery at Kwinana.



FIFTH YEAR Mechanical

"CLASS OF '62"

Fifteen tried performers faced up to the barrier in the final event of the pentathlon. All finished, although a couple tripped near the finish and had to be assisted to the line by newly won wives-to-be.

A glance through the list will quickly show that there was a crack field. "Fielder" writing in the "Sunday Splash" has this to say:—

1. Cooney, John

Married + 1. Had to marry a nurse to look after his child. Quitted George's brandy. Set up house in a strategic position mid-way between Uni and Steve's. Finish-

ed his 8 year marathon in a tired A30 with an outstanding performance—good stayer. Now with Mobil.

2. Hill, Geoff.

Married. Blasted his blasted way to 1st Class Honours—the noisiest man in the field. Re-introduced the class to the honourable game of doogs. Gone to Ford's.

3. James, Laurie

Married. Cunning fellow ensured cheap books for self by marrying a woman from bookshop. That's the last we've heard of him, but believe he drove to Sydney in his powerful Morris Minor—suspected to be having a good time there. Another good man gone. An English Electric man.

4. Jeanes Bruce

President of the Club, and used the privilege to turn up late to all but 5 lectures—



Socials one was held in 2nd term and proved to be a resounding success. The highlights of the evening were Prof's deadly accuracy with spears, Brian Leary's glorious golf shot with a 2 wood, Sav and Ads efforts in each beating 4 lecturers single handed in a boat race and Howard's mishap. This cancelled the 9 a.m. lecture on Tensors. Also that night, a new way of decorating kitchen walls was discovered—by covering them with Swan labels.

And so the year passed on. A cabaret was organiser and proved to be a tremendous success. Toward the end of the 2nd term Howard decided that his Tensor Analysis lectures should be scrubbed from the course, for even he was having trouble in understanding the subject, and would be best left to Kron.

The academic year drew to a close and we soon all realised the merits of good lecturing or otherwise. However, after an uphill struggle the whole 20 of us passed. Some of went to Rotto after the exams to help recuperate and ready ourselves for the Games.

So as one can see, it was a year full of laughs and achievements. The following dynamic personalities made the year what it was:

Geoff Adam: Seen carrying a ringed cushion for the cure of certain ailments. His claim to fame was $\frac{8}{3}$ average for his seminars. Now

working with the P.M.G. in Melbourne.

Paul Balagopal: Twisted the night away at the ball. Using his new-found knowledge in Kuala Lumpur, Malaya.

Kevin Barden: Ended his penal servitude at Uni to take employment with S.E.C., Victoria, so the rumour goes.

Mike Brinsden: Plunged into matrimony soon after the exams and is now in England with A.E.I. The deep freeze will certainly not worry this boy.

Wal Brockway: Flubber helped him to achieve great heights in basketball. At present pursuing a Maths degree at Uni.

Ric Downey: Can be summed up in two words, "Jeannie's Man". His hobby is working for the P.W.D.

Barry Foster: Immaculate golfer—could beat Arnold Palmer after much practice. The P.M.G. claws are in him for 5 years or more.

Bill Huber: Expounded theories on the E.C.M. which could even startle De Gaulle. Pleasantly enjoying work with the P.W.D.

Ray Jarvis: When he wasn't at lectures he was at St. Catherine Balls! A Project Mercury man at Muchea.

Ive Juracich: Seen on a slide with many "playmates of the month" at the Cabaret. In-

debted to the P.M.G. for employment.

Jack Limb: Acquired a new limb, so handed cigars to everyone including Ziggy at the 9 a.m. lecture. At the moment delving into the mysteries of Post Grad. work.

Rude Read: Relieved frustrations of exams by getting married a week later. Yet another civil servant with the P.M.G.

Beery Savass: Seen sitting on a block of ice in "The Big Strong Silent Men" slide production at the Cabaret. At present defending Aust. in the Army.

Ferd Spittell: The undisputed "block diagram" and squash king. His "block diagrams" covered 3 boards and more. Doing Post Grad. work with J.V.F. at Uni.

Elimir Turchanyi: Strong believer in physical exercise and jungle training. At present

employed with an electrical firm in Rivervale.

Darryl Tweeddale: Cupid forced him to walk Leslie home on many occasions. Been brain washed for the Railways.

Chris Wain: Famed photographer of the Goddess of the Library and many other beauties. Now promoting Bristile products.

Al. Wilkinson: Had many fond discussions with members of the class about social theories. Enslaved to the P.M.G.

Albe. Williams: Decided that Miss University 1961 was good enough for him to take to the Cabaret. Will be sailing shortly to England for Post Grad. work.

Keith Young: Showed great reluctance $R = \frac{\mu l}{A}$ to leave Uni. Now providing electric light for Sir Robert Menzies in Canberra.

When Engineers think of . . .

CONCRETE & STEEL ENGINEERING

they naturally think of . . .

HUMES *Limited*

SPECIALISTS IN THIS FIELD

SUBIACO - KELLERBERRIN - DONNYBROOK - DONGARA - MT. BARKER

The University of Western Australia

FACULTY OF ENGINEERING, 1963

Dean of the Faculty

Professor ALAN REGINALD BILLINGS

CIVIL ENGINEERING

Professor

K. L. COOPER, B.Sc. (W.A.), M.A., B.Sc. (Oxon), M.I.C.E., M.I.E.Aust., F.Inst.W.Sc.

Senior Lecturers

J. R. ESPIE, B.E., M.I.E.Aust.
R. SILVESTER, B.A., B.E., Ph.D., A.M.I.C.E., M.I.E.Aust.
B. CLEGG, B.E., A.M.I.E.Aust.
P. C. MASSEY, B.E., A.M.I.E.Aust., A.M.N. Z.I.E.
G. HONDROS, B.E., Ph.D., M.A.S.C.E., A.M.I.E.Aust., M.A.C.I.
R. SACKS, B.Sc. (Surv.), F.R.I.C.S., L.S. (S.A.), M.I.L.S.
G. G. REYNOLDS, M.E. (Adel.), A.M.I. Struct.E., A.M.I.E.Aust.
B. SMITH, B.E., A.M.I.E.Aust.

Lecturer

S. J. THOMAS, Dip.Mech.Eng.

ELECTRICAL ENGINEERING

Professor

A. R. BILLINGS, Ph.D., A.M.I.E., S.M.I.R.E.

Reader

K. W. TAPLIN, B.E., M.I.E.E., M.I.E.Aust. (Study Leave).

Senior Lecturers

J. V. FALL, B.E., Ph.D., A.M.I.E.E., M.I.R.E.
J. H. BUNDELL, M.Sc.Eng., Ph.D., A.M.I.E Aust., A.M.I.E.E.
B. G. LEARY, B.E. (N.S.W.), Ph.D. (Belf.), A.M.I.E.E.
D. H. STEVEN, B.Eng., Ph.D., Grad.I.E.E.
J. MILLS, M.Eng.Sc., Ph.D., A.M.I.E.Aust., Grad.I.E.E.

Lecturer

Z. L. BUDRIKIS, B.Sc., B.E. (Syd.).

MECHANICAL ENGINEERING

Professor

D. J. F. ALLEN-WILLIAMS, M.A., Ph.D., M.I.E.Aust., A.M.I.C.E., A.M.I.E.E.

Reader

J. A. COLE, M.Sc., A.M.I.Mech.E., M.A.S. M.E.

Senior Lecturers

G. G. LUTZ, B.E., M.I.E., Aust.
R. S. MINCHIN, B.E., A.M.I.E.Aust.
J. R. PHILLIPS, B.Mech.E., Ph.D.
J. HUNKA, Dipl. Ing., Dr.Eng., Ph.D.
E. W. HEMINGWAY, B.Sc. (Eng.), D.I.C., A.M.I.E.Aust., A.M.I.Mech.E., A.F.R.As.S.
J. R. WAGER, B.E., A.M.I.E.Aust.

Lecturers

K. D. LLOYD, B.Met.E., A.M.I.E.Aust., M.I. Brit.F. (Part Time Lecturer).
E. V. SEYMOUR, B.E. (W.A.), (Temporary Lecturer).

FIFTH YEAR:

CIVIL

Bunning, R. G.
Calder, C. M.
Campain, B. J.
Fisher, C. L.
Herzfeld, M. C. H.
Hodge, M. J.
Ong, K. C.
Parker, M. E.
Stone, R. M.

ELECTRICAL

Adam, G.
Balagopal, P.
Barden, K. R.
Brinsden, M. F.
Brockway, W. St. C.
Downey, R. J.
Foster, B. W.
Huber, W.
Jarvis, R. A.
Jurachich, I. P.
Limb, J. O.
Savvas, B. T.
Spittell, F.
Turchanyi, G. E. T.
Tweeddale, D. A.
Wain, C. H.
Wilkinson, A. E.
Williams, A. E.
Young, K. M.
Read, G. B.

MECHANICAL

Cooney, J. F.
Hill, G. P.
James, L. A.
Jeanes, A. B.
Lefroy, G. A.
Manchester, R. H.
McGann, P.
Mitchell, P. N.
Rock, G. J.
Rollinson, E. L.
Rozentals, J.
Skinner, R. W.
Style, R. K.
Warnes, N. A.
Wight, N. B.

FOURTH YEAR:

CIVIL

Brindley, R. F.
Dropulich, M. P.
Ellson, I. G.
Ffarrington, J. A.
French, J. A.
Grainger, B. R.
Humphry, L. R.
Penberthy, R. A.
Ryan, J. E.
Wallwork, M. D.
Wark, R. J.

ELECTRICAL

Beaumont, W. F.

Campain, R. A.
Day, P. R. E.
Duckham, I. G.
Farr, P. J.
Hartley, R. H.
Low, N. H.
Smith, W. R.
Teede, N. F.
Wood, H. T.

MECHANICAL

Beaumont, A. J.
Corver, J. E.
Drynan, K. N.
Elsey, R. W.
Johnston, V. D.
Kalmund, P. V.
Katnich, R.
Lim, J. H.
Skreiner, M.
Syed, A.
Watson, B. W.

THIRD YEAR:

Alderson, R.
Baldock, G. C.
Bartley, K. M.
Biggins, J. A.
Brearley, J. E.
Burden, H. J.
Chandashoto, S.
Chapman, R. V. B.
Chiang, S. P.
Chin, C. Y.
Chodorowski, T.
Cole, M. F.
Cook, D. J.
Crosby, N. R.
Cullen, H. G.
Drok, A. H.
Fawcett, I. W.
Filmer, P. J.
Formentin, A. L.
Gobolos, Z. C.
Gray, N. D.
Green, M. D.
Hong, K. C.
Jarvis, I. M.
Langford, S. N.
Lee, C. L.
McDavitt, R. C.
Middleton, A.
Mogridge, G. R.
Musk, F. A.
Oliveiro, C. J.
Padley, J. W.
Paget, W. R.
Paul, M. J.
Po, B. S.

STUDENTS, 1962

Rinaldi, B. A.
Sang, N. H.
Senusi, M. Y. B. K.
Smith, R. H.
Sung, Y. N.
Tajul, A. B. N.
Tan, Kia Lia
Thoo, Y. W.
Tresidder, T. N.
Vanderzwan, F. M.
Wark, K. R.
Whinnen, A. M.
Whitehead, G. H.
Williams, M. J.
Yeoh, K. K.
Zadnik, A.

SECOND YEAR:

Bennett, M. G.
Blackman, G. R.
Bligh, K. J.
Campbell, K.
Clancy, M. F.
Cole, T. W.
Collins, J. D.
Cooper, P. I.
Corish, W. A.
Crockford, G.
Duffy, W. J.
Faul, R. C.
Feldman, D. F.
Goh, T. K.
Grant, C. A.
Harris, L. R.
Harvey, P. J.
Heavey, L.
Hudson, G. R.
Hueppauff, P.
Hullett, J. L.
Humphry, N. E.
Jensen, R. L.
Jewell, R. J.
Kelly, J. H.
Kirkclady, G. T.
Kor, T. H.
Lazarus, E. D.
Mitson, R. A.
Molinari, B. P.
Moore, K. M.
Peraldini, J. M. P.
Phillips, P. E.
Pitman, F. S.
Powell, A. J.
Richardson, H. W.
Rushton, D.
Ryan, J. S.
Selladurai, T.
Smith, G. C.
Southwood, W. A.

Stanford, S. A.
Stevenson, C. S.
Supramaniam, A.
Sweet, J. R.
Tai, K. C.
Tan, Keng Long
Tang, D. L. P.
Thomas, I. G.
Tomlin, P. P.
Townshend, J. M.
Vanderswan, F. M.
Vandeth, S. H.
Vitali, R. J.
Walker, P. J.
Ward, I. W.
Yeap, H. L.

FIRST YEAR:

Abbey, G. J.
Adderley, K. W.
Allen, T. M.
Andersson, L. E.
Aram, G. S.
Bagley, C. A.
Baranowski, N.
Bartley, J. W.
Beetles, D. V.
Birney, J. H.
Bonker, J. M.
Bowra, N. G. A.
Brown, M. C.
Browne, E. M.
Carroll, P. J.
Chapman, G. C.
Cheng, N. K.
Chester, B. L.
Clarke, B. A.
Clarke, D. V.
Clemkey, D. G.
Coghlan, B. A.
Cole, R. J.
Cosgrave, N. J.
Coxon, J. R.
Craze, D. J.
Darlington, D. J.
Davies, E. V.
Dendroff, W. V.
Dickerson, A. W.
Doig, L. R.
Dufty, P. O.
Eastwood, T. R.
Elias, B. R.
Eyles, A. A.
Forster, G.
Garritty, D. W.
Goldsmith, J. A.
Graham, B. H.
Gray, R. P.
Harris, J. C.

Harris, R. A.
Hewitt, B. E.
Higham, J. A.
Ho, K. N.
Irvine, J. T.
James, G. J.
Jeffery, I.
Kelly, I. E.
Kerr, P. G.
Kirkham, L. O.
Kish, C. N.
Koniuchiwskyj, E.
Ladner, P. A.
Lance, F. J.
Leung, C. S.
Lim, S. J.
Lorimer, M. J.
Lukman, R. M. S.
McCullough, R. H.
McDonald, I. N.
McGill, K. J.
Macpherson, R. G.
Mace, H. J.
Macey, D.
Malyniak, R.
Martin, G. W.
Mercer, R. W.
Millen, C. H.
Mirkva, J. F.
Mitchell, K. I.
Muller, J. G.
Muljanto, H. R. F.
Nawawi, B. M. Z.
Nooreyezdan, R. F.
Norrish, D. O.
Pavlinovich, G. E.
Pritchard, R. G.
Ridzuan, B. H.
Roesenosocksmedi,
Ross, D. G.
Rozlapa, A.
Said, M. M.
Schoonens, P. C.
Sleeman, J. A.
Smalles, R. J.
Somow, A.
Spencer, J. R. V.
Sproule, A. N.
Stack, P. R.
Stewart, P. G.
Teh, J. K.
Temby, C. R.
Teoh, K. T.
Theunissen, R. F.
Thuy, N. D.
Turner, J. J.
Veal, C. P.
Wallace, P. A.
Warokka, W.
Wasty, G. U. S.
Waters, C. M.
Wildy, I. D.
Wilkinson, R. T.
Wilson, J. J. A.
Winters, K. J.
Wong, K. T.
Wong, P. Y.
Wu, N. W. Y.

THE INVISIBLE INGREDIENT

takes the bugs out of planning



It's not a device, a material or a component, it's a highly developed consultation service used by 5,000 industrial men every year *and it's absolutely free!* The Invisible Ingredient is the *knowledge* of Dunlop Technical Service. It's staffed by fully qualified, widely experienced Field Engineers who are ready to discuss, plan, advise and specify on *your* problem without charge.

When the problem seems impossible, don't abandon it. See if Dunlop can do it. Finding out costs nothing. Just call Dunlop Technical Service.

you can't beat

DUNLOP

INDUSTRIAL
DIVISION



5522



Aerial View of the Welshpool Works of

THE
STRUCTURAL
ENGINEERING

Co. of W.A. Pty. Ltd.

Steel Merchants and Fabricators

RAILWAY CRESCENT, WELSHPOOL

WE SUPPLY PLAIN OR FABRICATED



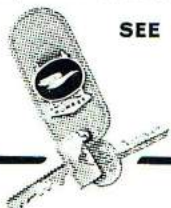
A MAGNIFICENT CAR
STILL FURTHER IMPROVED



THE NEW HUMBER

SERIES
IV
Super Snipe

**FULLY AUTOMATIC TRANSMISSION & DISC BRAKES ARE
STANDARD EQUIPMENT.** A policy of continuous development
has brought the HUMBER SUPER SNIPE to its present eminence. The
latest range of improvements in the Series IV makes it Australia's most
exceptional value in high-performance luxury motoring.



SEE AND DRIVE A HUMBER SUPER SNIPE TODAY!

only

£1998

TAX PAID

Skipper Bailey

MOTOR COMPANY LIMITED

900 Hay Street, Perth

PILPEL PRINT, PERTH